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THE SALT INDUSTRY IN INDIA

by

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FOREWORD.

Lala Shugan Chand Agarwal, who has compiled this book on Salt, has asked me to write a Foreword. Lala Shugan Chand Agarwal is a Superintendent of the Northern India Salt Revenue Department, which he entered over ten years ago after a brilliant University career. He has worked as a mining engineer in the Salt Range mines for some years. He has also been in charge of the manufacture of brine salt by the evaporation process. He has, thus, acquired a good deal of practical experience of the subject on which he writes. He has added to this practical experience great industry and thoroughness in collecting facts relating to the salt industry in every part of India. The result is a book full of interest and information, which cannot fail to be useful to those engaged in the Salt industry, whether as private manufacturers or servants of Government in the various Salt Departments. His book should also prove attractive to students and public men who desire full and accurate information on the subject of Salt which is of perennial interest not only as a condiment but also as a great national industry and a source of considerable revenue to Government.

2. This book has been prepared under the authority and with the general approval of the Government of India ; but it must not be understood that the approval of the Government of India extends to every statement of fact or each particular expression of opinion.

F. C. KING,
Commissioner. Northern India
Salt Revenue.

DELHI,
The 25th March 1936.

The Government of India were pleased to accept the Commissioner's recommendations that the book should be adopted as an Official publication and should replace the present publication, "The Systems and Practice of Salt Administration in India". They also sent me redrafts of the portions relating to Madras, Bombay, Sind, Burma, etc., proposed by the Heads of the Departments concerned for inclusion in the revised edition of the "Systems and Practice of Salt Administration in India" and ordered me to bring my book up-to-date in the light of these redrafts. I have accordingly gone over the whole work again and brought it up-to-date. Needless to say that the redrafts have been of immense help to me.

My thanks are also due to Mr. F. H. Byron, Collector of Salt Revenue, Burma, who kindly sent me books about the Burma Salt Department and corrected the chapter on Burma. Some Officers of other Salt Departments helped me with books and also went over certain portions of the book, but they have not permitted me to publish their names. My silent thanks are due to them. I also place on record my deep sense of obligation to L. Shiv Charan Das, Administrative Officer, Salt Range Division, Khewra, who willingly devoted considerable time and assisted me in the preparation of the book. L. Sheo Prasad Srivastava, B.A., and my brother L. Ghansham Das, B.Sc., B.T., P.E.S., Lecturer, Central Training College, Lahore, also deserve my thanks for their help.

SHUGAN CHAND AGGARWAL.

KHEWRA,
The 25th July 1936.

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CHAPTER I.

Historical Aspect of Salt in the world.

Salt is existent in all animal and vegetable life and is coeval with life itself. It must have been present in the first herbage that gave nourishment to the first beast. The history of salt is thus the history of civilization on earth. In the beginning, man must have absorbed sodium chloride from the uncooked flesh of animals, birds and fish. Herbivorous animals found little salt in grasses and instinct directed them to sea swamp pasturage and to outcropping deposits of salt. A deficiency of salt must have occurred and been felt by man, when he first began to use fire and boil food, since in boiling a certain percentage of salt is removed by water. His herds then must have directed his attention to " salt licks " from which they satisfied their saline wants and so enabled him to secure salt at a distinct condiment. Man in the beginning must have got his salt supply from brine springs, sea and outcrops of salt. There is no record to show when salt was first employed in cooking, but the use of salt as a condiment certainly shows a great advance in civilization.

From evidence discovered in dwellings of cavemen in Belgium it is supposed that salt was used in cooking of wheat 5,000 years ago. Old Mosaic, Chinese, and Sanskrit records also refer to salt. The Sanskrit word for salt is 'lavana' to which 'Nun', the common Punjabi word for salt, owes its origin. Susruta, the father of Indian medicine, speaks of four kinds of salts which correspond with rock salt, sea salt, lake salt and earth salt respectively. We read of salt in the Iliad of Homer (850 B. C.). Salt was known to the sagacious Hebrew, the aesthetic Greek and the imaginative Asiatic. The Greek and Roman writers refer to licking of salt ; the natives of Abyssinia lick it even now. It is not definitely known as to when salt became an article of commerce, but it is certain that salt trade was the earliest form of commercial enterprise. According to Herodotus (484 B. C.), the Egyptians salted ducks, quails and sardines ; they also preserved the bodies of their illustrious dead (Egyptian mummies) in salt. Caravans used to bring salt from North Africa across the Sahara. The Egyptians produced rock salt from the salt basins of the Sahara. Egypt doubtless exerted a great influence over the civilized parts of Europe. It is surmised that through her instrumentality the use of salt was made known to the surrounding nations and tribes. The Babylonians also knew the use of salt.

The first mention of salt in the Chinese language is found in the annals of Emperor Yu (2205-2197 B. C.). Even now salt is produced in China by solar evaporation. In Japan the manufacture of salt by boiling, etc., was introduced some 2,000 years ago.

We do not know the period when salt came to be regarded as a symbol of sanctity. In the times of Pythagoras, 600 B. C., salt was regarded an emblem of justice. Biblical records repeatedly refer to salt, where it is mentioned as an emblem of fidelity and wisdom.

Perhaps a high estimate of its hygienic value may have had something to do with the semi-sacred position occupied by it. Interest in salt is by no means of recent origin. The age-old adage ' worthy of his salt ' or ' True to his salt ' proves the importance attached to this commodity from times immemorial. In India even now many customs prevail which show the sanctity of salt. When two parties or persons have a mutual agreement or pact, they throw a pinch of salt in a pot of water and swear to stick to their promise saying that if they break their word, they may perish and vanish as salt dissolves in water and vanishes. People in the Punjab are against throwing away salt and have a superstition that if they throw away or waste salt by mixing it in dirt, they will have to lift it with their eyelids in the next world. These superstitions show the esteem in which salt has been held in India from times immemorial. Undoubtedly similar is the case in almost all countries, where mystic conceptions of salt still prevail.

Salt has thus had a potent influence on ancient literature, superstitions, and the nomenclature of places. Many old towns in Germany, as " Hallein " in Salzberg, derive their names from " Halle ", salt. A large number of English towns whose names terminate in ' wich ' owe their origin as well as their names to salt, for example Norwich, Sandwich, Greenwich. " Wich " meant a dwelling place, but was identified with salt industry and this termination was adopted as indicating a salt manufactory. In England the earliest description of salt occurs in Georgius Agricola's work " De Re Metallica " published in 1556 A. D. This book remained the standard text-book on Mining and Metallurgy for nearly the following two centuries. Extensive conservatism has been prevalent in the methods of salt manufacture. The method of preparing salt by heating brine persisted for a long time, till William Furnival introduced steam heat in 1823. He was the precursor of the great improvements afterwards achieved by the Vacuum process of Boiling.

The great salt mines of Wieliczka in Poland in the lower Carpathians have been worked since the 13th century. These mines with their underground houses, monuments, chambers, ball rooms and resturants, lakes, bridges and railway stations constitute a city that reminds one of the art and industry of by-gone periods. The Rumanian salt mines of Tirgu-Ocna and Ocnele-Mari have also been worked for centuries. In America salt springs were discovered about the middle of the 17th century in New York, but manufacture of salt on a commercial scale was not begun till 1788, when the industry was established in the vicinity of Syracuse. Solar salt is still manufactured there on a vast scale. Salt manufacture has been going on in Italy, France, and Portugal for centuries. The Italians were the pioneers who developed salt works in Aden as well.

In India manufacture of salt along the sea coast, in Bengal, Bombay, Madras and the Runn of Cutch flourished as a cottage industry for centuries. In his " Early History of Bengal " Mr. F. H. Manahan gives a passage from ' Arthasastra '—a book dealing with the history of the Mauryan period (300 B. C.) which says that salt manufacture was even at that distant date supervised by a State official named ' Lavanadhyaksa ' and the business was carried on under a system of

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licences granted on the payment of fixed fees or part of the output. The tradition handed down from Hindu Kings of old is even now followed by the Government of India who not only supervise the manufacture of salt, but are themselves the most important manufacturers. In the Punjab rock salt has been known for a long time. Alexander the Great noticed that Indian mountains contained rock salt. In some of these mountains abandoned rock salt mines of an ancient date still exist. In olden days, people in the United Provinces used to get their supply of salt by lixiviating salt earth which practice still prevails in some parts. Salt works existed in almost all Rajputana States. It is, however, since the British occupation that regular and systematic mining or manufacture of salt on a commercial scale has begun. India now produces about 1,500,000 tons or roughly 4 1|2 crores of maunds of salt per annum, Bombay salt works, Madras salt factories, salt works in Karachi and Kharaghoda, Rajputana Salt Sources, *i.e.*, Sambhar, Pachbadra and Didwana, Salt Range and Kohat Mines make up this quantity. Attempts are now-a-days being made to expand the sources of supply to make India capable of producing about 2,000,000 tons which is her total annual requirement.

CHAPTER II.

Common salt—Properties and Uses.

(*a*) PROPERTIES.

Salt was the name originally given to the residue left by evaporation of sea water. Afterwards the name was employed to include all substances held in solution in sea water. Chemists ultimately extended the name to cover all combinations of an acid and a base. Sodium chloride (NaEl) now called common salt is an example of the simplest type of chemical salt. A molecule of common salt contains an atom of chlorine combined with 23 parts by weight of sodium to form 58.5 parts of common salt. Rock salt is rarely found in an absolutely pure anhydrous state in which it is colourless and perfectly transparent. In most rock-salt mines such specimens are considered curiosities. In Wieliczka mine in Poland and in Khewra mine in the Punjab large masses of salt containing over 99 per cent. NaEl are met with. In the Punjab mines we meet with salt of different colours such as white, pink, darkish or red. The colour disappears when salt is crushed to powder. The colour of sea water is affected by the percentage of salt in it ; as the quantity of salt decreases, the colour changes from blue to green. Salt is met with in any colours ; white, pink, red, brown, greenish and grey. The red or green colour is attributed to the presence of infusoria.

Salt is highly soluble in water, 100 parts of which dissolve 37 parts of salt. The specific gravity of such solution is 1.2 ; the specific gravity of salt crystals is 2.16. The smallest quantity perceptible to taste is 68 grains of salt dissolved in a gallon of water.

Pure sodium chloride is not deliquescent. It, however, absorbs moisture owing to the presence of magnesium chloride.

Sodium chloride melts at very high temperatures, at still higher temperatures it evaporates and at white heat it volatilizes forming thick clouds. It does not diffuse much, even when masses of varying densities are superimposed on one another.

Salt is fairly hard. There is no standard unit fixed for hardness. Geologists, however, compare the hardness of minerals by a comparative table (Moh's table of hardness), according to which the hardness of talc is considered as one and that of diamond ten. According to this standard the hardness of salt is 2.5. Its cohesion or power of supporting pressure is twice as great as that of bricks.

Common salt is a crystalline substance ; crystals generally form cubes and sometimes they form octahedrons. The form of crystals depends on temperature, state of rest or motion, length of time, etc. Salt has a perfect cleavage. It splits up readily into planes parallel to the faces of the cubes of which it is composed.

Salt has acoustic properties as well—that is to say it is a good medium for the transmission of sound. Workmen in a salt mine are able to signal by blows on the face of the rock. Salt possesses in a high degree the power of staying decomposition in dead organisms and is the commonest of all preservatives. Owing to this property it is an absolute necessity to the life of man and the higher animals.

Salt water trickling through the roof of a working also forms stalactites and stalagmites just as lime-stone forms them. In Khewra mine we meet with long hollow tubes of salt formed by the brine trickling drop by drop through the roof.

Rock salt has many minerals associated with it ; for instance, gypsum, sodium sulphate, magnesium sulphate and magnesium chloride. In the Khewra mine, salt is found mixed with variously coloured clays, white, pink, red, variegated gypsum beds, lime stone, mangnesium sulphate. Bad salt is associated with magnesium sulphate and good salt with calcium chloride. A cubic foot of pure rock salt weighs about 130 pounds or about 1½ maunds.

(*b*) USES.

It would mean a small book by itself, if the uses of salt were to be given in detail ; so they are given in an outline only.

Common salt is a necessity of life. It imparts an agreeable flavour and improves the taste of food, and is used as a condiment. It may be interesting to know how exactly salt consumed in its natural or artificial form functions in the human body. It promotes digestion, since when absorbed it is turned into hydrochloric acid—an essential constituent of gastric juice. It also acts as a stimulant to nerves and causes increased flow of saliva. It is present in blood and muscles. It is antiseptic, prevents putrefaction and promotes cell formation of the body. Too much deficiency of salt in the human body would give rise to worms in the stomach. It controls the density of the blood maintaining it in a condition conducive to health. A diminution of salt in the blood results in disease ; the blood loses its richness and is deprived of its vitalizing property. Salt, in short, is a preserver of health.

Salt is no less essential for cattle and sheep. Where cattle live mostly on grasses which are deficient in salt, they travel long distances in search of it. In fact, amongst cattle salt hunger obtains in such an intense form that cattle are often induced to lick human or animal excreta. A liberal use of salt for cattle saves them from disease and improves their constitution. For sheep farming too salt has an inestimable value when mixed with food. It contributes to the betterment of wool. Want of sufficient salt causes various diseases amongst the livestock. Lord Lawrence, in his evidence before the Select Committee on East India Finance in 1873, attributed the prevalence of murrain in the Indian cattle to the want of salt in their food.

Salt is also very valuable for agriculture. Its use as an agricultural manure has been recognized for ages past. It was used as a chemical manure long before the Christian era, and its value was recognized throughout Europe. The ancient Hebrews applied it as a manure over 2,000 years ago in Palestine, and so did that eminently agricultural people the Chinese and do still to this day. The old Romans too used it as manure. In India its use in argriculture is rather looked on with disfavour. Just as salt stimulates digestion so it causes increased nutritive activity in the tissue of plants and has healthy stimulating effect on them, renewing their health and vigour. It dissolves certain salts, for instance, earthy phosphates and thus assists in their assimilation by plants. It also assists in dissolving silica and the oxidation and solution of iron. It attracts moisture to the soil and so helps vegetation. Salt also undergoes chemical changes in the soil which may result in the formation of fertilizers such as sodium carbonate, sodium phosphate, etc., and is a valuable fertilizer. Great discretion, however, is required as to the quantity of salt to be used in agriculture. Salt manure is good on light, sandy, siliceous soils, half a ton to an acre is quite sufficient and is to be applied three or four months before the sowing time. The very fact that salt is present in plant ashes proves that plants require it. Mr. Arthur Young, an outstanding figure in the history of English and even European agricultural renaissance, considered salt of great value as fertilizer.

Salt has germicidal properties as well. These make it invaluable to the farmer, planter and florist alike. To the coffee planter it possesses a great boon in its deadly effect on the coffee borer—a pest responsible for serious damage to coffee plantations. It kills many parasitic fungi that starve the growing and delicate plant; analogous to this is its property of destroying weeds in the fields that struggle with the cultivated vegetation to wrest nutriment from the soil.

Another branch of economic activity in which salt is indispensable is fish-curing. It is a preservative, has the valuable property of preventing putrefaction in dead organisms and is consequently used for fish-curing all over the world. Fishing encourages sea-faring life. A flourishing fishing industry thus has an important bearing not only on the establishment of a mercantile marine, but also on the maintenance of a regular navy. By virtue of the same property salt is used for food preservation and pickles, etc.

The use of salt in modern industries is equally or perhaps more important. A number of arts and manufactures of modern civilization owe their existence to salt. In short, salt is indispensable to industrial advance. This is so as modern industrial science is, in essence, applied chemistry and chemicals are in the main : salt. Martin Smith and Milson in " The Salt and Alkali Industry " say, " From salt as the parent substance, there spring the huge industries, which are concerned with the manufacture of sodium sulphate, hydrochloric acid, sodium carbonate, caustic soda, chlorine, hydrogen, etc." These in their turn support the superstructure that enables every modern convenience for a civilized life to be provided. Out of these " spring industries concerned with the manufacture of soap, glass, glycerine, dynamite and other nitroglycerine explosives, bleaching powder, chlorates, etc. These products in their turn form the raw materials of great trades which ramify, one into another in a way which is difficult for the non-technical reader to realise ". Salt is used in various other industries such as dyes, glass, pottery and for assaying in mints. It is used in ice machines, tanning (curing hides), bleaching oils and preservation of timber. It is also used by colour manufacturers, zinc founders and ship-builders. The textile and paper making industries require chemicals for bleaching and sizing and cheap soap for scouring—all these are derived from salt as the basis.

Salt finds many important uses in medicine as well. Salt is given internally in many diseases. Its antiseptic properties make it useful in surgical operations. It is also used in veterinary practice. Salt baths or baths in sea are said to have a stimulant effect on the skin. The medicinal properties of mineral waters are in no small degree due to the presence of salt.

Last, but not the least, salt is a valuable source of public revenue. Many civilized States derive a handsome income from duty on salt. Its beauty is that it reaches every member of the community and thus every person pays his quota to the State and spread over a large population it yields a handsome revenue. India consumes about 5½ crores of maunds of salt per annum, and the net revenue at the present rate of duty amounts to more than 8 crores of rupees.

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CHAPTER III.

Common salt—Geographical distribution and origin.

(*a*) GEOGRAPHICAL DISTRIBUTION.

Salt is a mineral of universal distribution and, fortunately, it is a commodity easy to obtain. There is no possibility of its ever being exhausted. Salt occurs dissolved in sea, in springs, in lakes, stored in the earth in mines, spread out in swamps or efflorescing on plains in every part of the world. The universal presence of a necessity of life like salt is looked upon as an evidence of design in the creation of the world.

The sea is the biggest store-house of salt. Common salt forms 76 per cent. of the total salts dissolved in sea. It has been estimated that the sea contains about 58,000 cubic miles of salt.

Salt Lakes.—Salt lakes are another store of salt and exist in almost every part of the world, though they are more numerous in the northern regions than in temperate or tropical Zones. In Central Asia we find only salt lakes. Elton in the Kirghis, Kosiak in Asiatic Russia, Inder in Ural river are a few well known lakes. Besides these there are others in the steppes of Asiatic Russia. The dead sea is an important salt lake in Palestine and Lake Oroomiah in Persia. There are numerous lakes in Tibet and a number of them exist in the northern end of the Black sea. In India the Sambhar Lake in Rajputana is well known ; now-a-days it yields about 80 lakhs of maunds of salt per annum. In addition to this there are Pulicat and Chilka lakes which are situated on the Coromandal Coast. Africa, Australia and America have several salt lakes ; Lake Utah in America and lake Austen in Australia are well known. There are several salt lakes on the pampas of Laplata, in South America. In the island of Cyprus there are extensive salt lakes near Larnaca, the Capital.

Brine springs.—Brine springs which are sub-terranean streams of water impregnated with salt from percolating through saliferous strata are found in many parts of the world. There are brine springs in New York, near Syracuce, in Java Island, in Cheshire, Staffordshire and Durham in England, and in Germany. Salt deposits of lake Inder in the Asiatic steppes of Russia have been formed from brine springs. In the north of India, brine springs are met with at the foot of hills in the Trans-Indus Salt Range. They also exist in China, Italy and Switzerland.

Spontaneous salt.—Spontaneous salt or naturally formed surface salt is found everywhere. It is met with in Australia, America, Peru and Chile and in the steppes of Russia. In India spontaneous salt occurs in the United Provinces, on the Coromandal Coast in Madras and in Burma. In the great desert of Mongolia many square miles of the country are spread with salt incrustations. Spontaneous salt contains nitre and salt in varying percentages.

(*i*) *Rocksalt.*

Rocksalt is met with and mined in many countries. The most extensive deposits in the world are those formed on the continent of

Europe extending over 500 miles along the Carpathian mountains, stretching out laterally for 100 miles, and having a thickness of 1,200 feet in some places. This range comprehends the mines of Wallachia, Transylvania, Galacia, Upper Hungary, Tyrol and Germany. The Wieliczka Mine, the largest salt mine in the world which has been worked for over 700 years, is well known. The salt mines in Roumania have also been worked for centuries. In England Chesire salt deposits have been worked for over 200 years. There are valuable mines of salt in France and Greece as well. In America rock salt is found in Virginia, Navada, the Andes, the Alleghannes. In Africa it is found in Algeria, Tunis, Morocco, Abyssinia and in the salt rocks of Tegaza west of Sahara desert. Rock salt is also found in Tibet, Burma and Siberia. In Persia rock salt is found near Ispahan and in the island of Ormuz.

In India extensive rock salt formations exist in the Punjab and the North West Frontier Province. The Punjab Salt Range contains some of the richest deposits of rock salt in the world. The cis-Indus Salt Range is about 130 miles long and 5 miles broad. Here the thickness of the salt bearing strata varies from 400 feet to 900 feet. The Khewra salt mine is the biggest mine in this Range. The trans-Indus Range extends beyond the Indus to the N. W. Frontier Province. Its area is 1,000 square miles. About one-fifth of the entire area is taken up by salt. The deposits of rock salt in the known formations are estimated to be 500 cubic miles.

It will thus be seen that beds of rock salt and brine are common in nearly every country in the world. The following table shows the distribution of rock salt and brine in the world according to their Geological ages :—(Table taken from ' Salt deposits of Canada and the Salt Industry ' by L. Hebercole).

Geological Formation.	Localities.	
	Brine.	Rock salt.
Recent	California (sea water); Utah; Arabia; South American States (sea water); shores of Dead Sea; Algeria; Mexico (sea water); Portugal (sea water).	Utah; Nevada; New Mexico; Kirghiz steppes; Arabia; Chile; Columbia.
Tertiary	Armenia; State of Tamaulipas, Mexico; Java, East Indies.	Louisiana; California; Cordona Spain; Wieliczka and Bochnia, Austria-Hungary; Siebenburgen; Asia Minor; Armenia; Lungro; Italy; Roumania; Volteria, Italy; Kulusz; Galicia; Transylvania; Caucasus Mts.; Salt Range, India; (?) (2) Persia.

Geological Formation.	Localities.	
	Brine.	Rock salt.
Cretaceous	Westphalia; Algeria; Kansas; Texas; State of Puebla, Mexico; State of Coahuila, Mexico.	
Jurasic	..	Rodenburg on the Deister; Bex, Switzerland; Cerro de Pasco-Peru.
Triassic—		
Upper	Worcester; England; Cheshire, England.	Nancy, France; Halle, Berchtesgarden, Hallein, Aussee Tyrol; Cheshire, England; Antrim, Ireland; Isle of Man.
Middle	..	Wurtemburg; Thurigia, Ernsthall, Stottenrheim; Canton of Aargau, Switzerland.
Lower	..	Schoeningen, near Brunswick, Salzderhelden.
Permian	Russian salines	Stassfurt, Germany; Texas; Oklahoma; Hanover; Heilbronn.
Carboniferous	Nova Scotia, New Brunswick, Canada; Michigan; Ohio; West Virginia; Texas; Pennsylvania; Nebraska, U. S. A.	Durham and Bristol, England; Kansas; Texas; Virginia; Oklahoma.
Devonian	New York (Ordovician to Devonian); Alberta, Canada (?); Manitoba, Canada (?) Yeneseisk, Siberia; and Irkutsk, Siberia.	..
Silurian	Manitoba, Canada (?); Szchuan, China (?).	Ontario, Canada; Michigan New York; Ohio, U. S. A.

NOTE.—The sign (?) after a locality means that the age of the deposit is not definitely determined.

(*b*) ORIGIN.

(*i*) *Rock salt.*

The origin of rock salt is one of the enigmas of nature. It has long been of academic interest and many theories have been propounded to account for the different forms in which salt deposits occur.

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Volcanic theory.—Vulcanism or Volcanic action—the phenomena connected with the ascension of heated materials from the earth's interior to its surface—has been made use of in numerous cases to explain the origin of many mineral deposits. It was early applied to explain the origin of salt deposits, especially since hydrochloric acid and sodium chloride were proved to be present in the emanations from volcanoes. The absence of organic remains in rock salt and its association with unburnt coal, gypsum, naptha and petroleum rule out this theory.

Aqueous theory.—The theory that salt deposits are the result of deposition from sea waters, is the present accepted theory. The frequent occurrence of bodies such as bitumen and organic remains and of cavities containing liquids and in some cases gases in almost all varieties of rock salt furnish indisputable proof of the deposition of this substance from its aqueous solution. The occurrence of sand-stone pseudomorphs in the cubical form of rock salt also favours this opinion. Moreover, the same salts are found associated with rock salt as are found in the sea, for instance, calcium, magnesium and sodium sulphate, potassium and magnesium chloride. Salt deposits occur as if they formed in a basin—they are thickest in the centre and thin out towards the edges. Sometimes they are irregularly formed. This general character of the deposits is a strong argument in favour of their aqueous origin. The deposits rarely occur in the form of dikes or masses filling vertical fissures which is the usual form assumed by molten mass projected upwards from the interior of the earth. Salt is itself a sedimentary rock and stratification is one of the distinctive marks of the aqueous origin of a rock. The presence of gypsum in close association with it is another argument in support of this theory. It is said that homogeneous, transparent and crystalline structure of rock salt met with in mines is unlike any product made from the evaporation of brine. This argument against the aqueous theory, however, falls to the ground, as we see massive deposits of rock salt at the bottom of some salt lakes, for instance, Lake Inder, even at the present day. These deposits show that under certain conditions crystalline and massive masses of rock salt may form on the evaporation of brine. Another argument advanced against this theory is the absence of fossils in rock salt. This is easily explained. Life cannot exist in a brine of certain density and as the brine got concentrated, all animals must have run away. It is believed that the crystallization of salt must have taken place at great depths and then movements of the earth's crust and upheavels must have raised the low lying areas.

(*ii*) *Natural brines.*

Natural brines are found in many parts of the world ; and many theories have been put forward to account for their origin. The most important theories may be classed as follows :—

(*a*) The leaching out of salt beds by meteoric waters.

(*b*) The leaching out of salt crystals disseminated through stratified rocks.

(*c*) From original sea water enclosed or imprisoned in a porous stratum.

The variations and combinations involved in these theories, however, are so numerous, that it is almost impossible to assign any definite origin to any one brine occurrence.

(*iii*) *Salt lakes and salt marshes.*

The salt lakes and salt marshes owe their origin to the overflow and subsequent retirement of the sea water, the sites having been originally the bed of the ocean. When the ocean receded to its present levels, it left in the depressions of land volumes of water of various depths, elevations, extents of surface, according to their deepness, altitudes and angle of declivity. Thus the great Salt Lakes are the remains of the inland sea. At one time the low-lying country west and north of the Caspian Sea was part of the Inland Sea, its surface contracted by shrinkage and the retreating water was left in numerous swamps which now form salt lakes.

CHAPTER IV.

Indian Salt Industry in Pre-British days.

To have a clear idea of the development of salt industry under the British Government, it is essential to know the condition of the industry prior to and at the time of the British occupation. India has enormous quantities of salt, in the form of rock-salt mines, salt lakes, salt efflorescence, brine springs and sea brine. Prior to the British occupation of the country salt was manufactured in various parts of India. It will be useful to make a survey of the conditions prevailing at that time province by province.

(*a*) NORTHERN INDIA.

In pre-British days the Northern India territories, the North-West Frontier Province, the Punjab, Delhi, the United Provinces, Central Provinces, Ajmere, etc., got their salt either by manufacturing it by the lixiviation of salt earth or from the Salt Range mines and quarries or from Sambhar, Pachbadra, Bharatpur and Sultanpur salt works. The Mohammedan rulers raised revenue from salt by means of imposts on the privilege of manufacture and by transit duties on its transportation from the source of manufacture to the interior. These duties had frequently been farmed out. The Punjab mines were in possession of the Sikh Rulers who also farmed out the mines to persons of eminence on contract. The farmer was under no restriction as regards time, place or price and could sell salt wholesale or retail either at the mines or in distant markets. But owing to mining and transport difficulties, the Punjab rock salt did not go very far. Cis-Sutlej Punjab got its supply from Rajputana sources. The portions worked by the Sikhs still exist in Khewra and Warcha mines, but their work was unsystematic and unscientific. The output in those days was about six lakhs only. The Kohat quarries of Bahadar Khel, Jatta, Karak, Nari and Malgin were farmed out to Kohat chieftains.

Guma and Drang quarries in the Mandi State were worked by the Maharaja who got all the revenue. The salt was consumed in adjacent villages. The salt was rather impure containing only 60 to 70 per cent. NaEl.

(*b*) RAJPUTANA AND CENTRAL INDIA.

Extensive salt works existed in almost all States of Rajputana before the British occupation. The lease of Sambhar lake was taken by British Government in 1870. The leases of Pachbadra and Didwana were also taken. The Phalodi and Luni tracts were capable of producing large quantities of salt, but they were situated so far away in inaccessible places, the former far away in the desert and the latter at the head of the Runn of Cutch, that transport of the produce to markets was difficult and they gradually declined and were ultimately closed. The river Luni flows in a south-westerly direction to the Runn of Cutch and is for a long distance up from its mouth simply a vast natural deposit of salt. This natural salt was used by the people. Pokharan was another salt marsh 12 miles west of Phalodi. The Kachor Rewassa source in Jaipur manufactured a great amount of salt and was leased by Government in 1878. Salt was also manufactured in Nuh and Sultanpur works which were taken over by Government. Salt was also manufactured in other States, *viz.*, Udepur, Alwar, Bikaner, Bharatpur, Bahawalpur, Dholpur, Datia, Kishangarh, Rutlam, Indore, Jhallawar, Bhopal, Dewas, Jaora, Gwaliar and Lewra. There were hundreds of salt producing villages. Agreements were entered into with the rulers of these states for suppression of salt manufacture and abolition of transit duties and taxes on salt on which duty had been levied by the British Government. Bharatpur alone is said to have been producing 44,000 tons annually when the works were closed by the Maharaja in 1876-77.

Before 1861 the saltpetre industry was unfettered. Lunias educed a lot of salt which was consumed by the poorer classes. Saltpetre was manufactured from nitrous efflorescence in the Punjab, U. P., and Bihar and great quantities of salt were educed therefrom. In the Punjab earth salt was greatly manufactured in the Rajanpur sub-division of Dera Ghazi Khan district under contract system.

Salt was formerly prepared in Berar to a considerable extent, the sources of supply being drawn from the Lonar lake and the numerous brine wells of Purna in Akola.

(*c*) SIND.

Sind has extensive natural salt deposits which have been worked from times immemorial. The salt deposits have been mentioned in all the records since the British occupation. Mr. John McLeod, Collector of Customs, Karachi, in his "Memorandum on the Pearl Banks, etc., and the salt beds of Sind" 1847, speaks of the deposits of Thar and Parkar and in the Rann of Cutch. He states, "the salt used in Kurachee is brought from the direction of Sonmeeanee, where it is found in deposit in beds of small size. It is found in the Mulleer river, and is met with along the entire coast, in greater or less quantity ; in the interior of the country it is produced by parties who gain their living by its manufacture which is as follows ; patches of salt earth are found scattered over the entire surface of the country ; this salt soil is saturated with water, and the drainage is exposed in shallow vessels to the rays of the sun".

Captain Stanley Raikes, a Magistrate of the Thar and Parkar Districts in his Memoir on these Districts (1856) wrote that a considerable revenue was derived by the Zamindar of Veerawow from a salt lake situated close to his village. He also mentioned that during 1845-46 in 10 months 60.928 maunds of salt were exported from this Mokye Salt Lake. Besides Mokye there were many other *Dhands* or salt lakes. Also there were numerous natural deposits of salt along the coast between Karachi and the Runn and in the desert to the north of the Runn. The lakes are situated in Jhils in the desert. These Jhils are filled with water during rains and on drying up leave a deposit of spontaneous salt which is covered over by a hard layer of sand. The surface is broken with a pick axe, about 9″ below the surface brine appears and a few inches deeper are found solid masses of pure salt steeped in 25°B brine. This salt was collected and used by the people. Salt was also manufactured near Karachi at the head of a creek. Besides, 'Lunaris' or salt makers used to make large quantities of salt by lixiviation from salt earth especially in Upper Sind near Jacobabad. Some salt works also existed at Mamul near the Jacobabad frontier.

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(*d*) ASSAM.

Formerly salt was manufactured from brine wells. For example, the springs of Borhat and Sadiya were in 1809 said to have yielded 1,00,000 maunds. In Cochar, Manipur and in some hill tracts isolated localities are even to the present day famous because of their salt wells. In olden days the hill tribes in these localities used to boil down the brine to get salt.

(*e*) BENGAL, BIHAR AND ORISSA.

In pre-British days local manufacture of salt by boiling brine went on along the coast, licence fees being levied on manufacture and duties imposed on transport. Patches of saline soil where small scale manufacture of salt is possible exist even now. These tracts are, however, scattered and the local people manufactured salt wherever they could. The climate of Bengal is very humid and unsuited to salt manufacture by solar evaporation. Solar manufacture does not appear to have been resorted to in pre-British days, but salt was manufactured by artificial heat. The local manufacturers were called "Mulanghis". In 1835-36. 44,00,000 maunds of locally made salt were sold at auction sales.

Salt was largely manufactured on parts of the sea board of Bengal including the present province of Orissa. 'Panga' salt was educed by boiling the brine obtained by the lixiviation of saline earth. This method was practised in numerus places on the coast of Orissa but mostly in Balasore and Cuttack Districts. Manufacture of Karkatch salt—salt obtained by evaporation of brine by solar heat—was going on near Chilka lake south of Bihar. It is said that forty thousand men were interested in earth salt industry in Bengal, Bihar and Orissa at the time of the British occupation. In 1835-36 private individuals manufactured salt in Bihar, but the salt had to be sold to Government. In 1847 the manufacture of salt by the public under a system of excise was permitted. Under this system salt was manufactured to a great extent and was sufficient to meet the requirements of the province. The local industry was more or less protected by bad communications. The opening of the East-Coast Railway facilitated the import of cheaper Madras and foreign salts which proved fatal to it. A large quantity of earth salt was also manufactured, especially in Bihar. Salt was educed in the process of manufacture of saltpetre especially in the Bhagalpur District in Bihar.

(*f*) MADRAS.

Salt earth is available in Madras in saline tracts from which earth salt is manufactured ; salt also forms spontaneously in swamps. In olden days salt was manufactured by solar evaporation as well as by boiling. Spontaneous salt was extensively used for human consumption and earth salt for curing fish. Edible salt was also educed in the manufacture of saltpetre which for many years was carried on free from any restraint or regulations. This salt was consumed by the poorer classes. The Government salt monopoly was created in 1805. In Mysore earth salt manufacture was a recognized industry which went on for ages.

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(*g*) BOMBAY.

Salt was manufactured from subsoil brine at Kharaghoda on the border of the lesser Runn of Cutch, Gujarat, Kathiawar, Dharangdhra and other States had numerous salt works. Sea salt was also manufactured, but the methods were rather crude. Even now salt manufacture in Bombay is mostly a private enterprise carried on under excise system. Bombay manufacturers are intelligent and resourceful and have developed these traits through long experience. All along the coast in the Runn of Cutch salt deposits form and the industry flourished as a cottage industry. A great quantity of salt also forms in the Runn. There were numerous deposits at some distance from the Runn. Even now the manufacture of salt in Kathiawar States is permitted under certain conditions. There were salt works in Daman and Goa. Salt was also manufactured in Okhamondal in Baroda. and in most of the Indian States such as Cambay, Janjira, Savantvadi, Phaltan, Patri, Jhinjuvada, Radhanpur, etc ; the works were closed and adequate compensation amounting to about Rupees one lakh per annum is paid to the Chiefs of the States by Government.

(*h*) BURMA.

Salt manufacture is a cottage industry in Burma and has been practised for ages. In olden days salt was obtained by the combined process of solar evaporation and boiling. Boiling was done in earthen pots or iron cauldrons. The salt boiler being conservative, the same method persists up to the present day. The Burmese have a motto which means " When all fails, cook salt ". This shows that the manufacture of salt by boiling has been the resort of the poorest of the poor. According to Mr. Plowden's report submitted to the Government of India in 1856 salt was manufactured and sold subject to an excise duty levied in the shape of a licence.

In Upper Burma salt manufacture was more or less a hereditary occupation. Even now it is a cottage industry generally carried on by women and is subsidiary to agriculture. Brine was taken from wells or natural efflorescence was used. Burma has 1,200 miles of coast line and numerous salt deposits form in swamps, lagoons and creeks. Thus local manufacture went on at numerous places scattered all over the country. The industry would have died out but for low assessment rates ; the rates of duty levied as composition fee have been much lower than duty on imported salt.

It will be clear from the foregoing that the salt industry prior to and at the time of the British occupation was unorganised. People geographically well situated as regards salt works or sources got their salt much cheaper than those who were far away. In general the methods were primitive and unscientific and the cost of production was high. The British Government adopted a policy of equalization of duty and price throughout India resulting in concentration of manufacture at important sources, the introduction of up-to-date scientific methods and low cost of production. The output from many sources now is at least six or seven times the amount they produced when the British Government took them over.

CHAPTER V.

Punjab Salt Sources.

A.—SALT RANGE.

(*a*) HISTORICAL.

The history of the Salt Range is shrouded in mystery. There is no record to show when the treasure in the Salt Range was brought to the notice of man. It, however, appears certain that the Range must have been noticed by man in very ancient times and utilized for the supply of salt. History tells us that Alexander the Great (327 B.C.) noticed that the Indian mountains contained salt. The Punjab Salt Mines have also been mentioned in the book ‘ Ain-i-Akbari ’, (The history of Akbar’s reign). After the Moghuls the mines passed into the hands of the Sikhs. Dr. Jameson published a report in March 1843, under the title of “ the Geology, Zoology, etc., of the Punjab and a part of Afghanistan by William Jameson, M. R. C. S. on deputation to the Indus ”. He gives a graphic description of the Salt Range and the various salt mines. He states that the mines were under the Sikhs, Raja Gulab Singh’s men. The portions worked by the Sikhs still exist. So there is not the least doubt about the antiquity of the mines. A tradition exists amongst the miners at Khewra that their tribe has been working in the salt mines since the Mohammedan year 600 H or about 1,200 A. D., *i.e.*, for nearly the last seven hundred and forty years.

The Sikhs had no regular system of management of the mines. No scale of levy was fixed ; the capitalists to whom the mines were farmed out had the monopoly of salt. It was one of the articles subject to Town and Transit duties. When the Sikh possessions came under the British protection, the Lahore Council of Regency agreeing to the arrangements proposed by the British Resident abolished the Town and Transit duties, and levied a fixed duty of Rs. 2 per maund.

A new contractor was appointed and authorized to levy the duty on payment of a fixed sum of rupees six lakhs to the State. When the country was annexed in 1849, fiscal reforms were undertaken on a more drastic scale. An entire change was made in the system under which the revenue from salt was derived under the Regency. Government took the management of the mines in their own hands, and levied a fixed excise duty. Salt then became free from any further restrictions. In 1850 the mines were under the jurisdiction of the Commissioner of the Jhelum District who was in charge of the Salt Revenue Department. The actual administration and collection of revenue was vested in a collector. The mines remained under the Punjab Salt and Customs Department till 1869-70, when they were made over to the Inland Customs Department. The mines were then known as the Shahpur Mines in the Shahpoor Customs Division. Under the British regime, a steady increase occurred in the output and revenue developed on account of efficient management, cheapness and increased facilities for transport. Moreover, due to its intrinsic purity, this salt became very popular. The Mines Division was known as the Cis-Indus and Kalabagh Mines Division until 1918 when it was named the Salt Range Division.

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(*b*) GEOLOGICAL.

Different theories about the origin of Rock salt deposits in the world have already been dealt with in the third chapter. The treasure of rich, pure, crystalline and reddish coloured rock salt in the Salt Range is believed by geologists to have been formed in certain enclosed bays or lakes formed out of the slowly receding Tethys sea, which once covered the whole of the Punjab, the Himalayan region, Rajputana and other parts of Asia. When the waters of these lakes gradually evaporated, layers after layers of sodium chloride along with other salts were deposited. They form the thick salt seams which crop up in numberless places from the Jhelum to the Indus.

The series of actual strata that occur in the neighbourhood of Khewra are called sand-stone and salt formations of the Salt Range. The most characteristic strata of this formation are the green sand stone and brick-red gypsum. The former constitutes the crown of all heights. The brick red gypsum crops out on the base of the hills and in the gorges indicating the salt formation all over the Salt Range. There are enormous quantities of brick red gypsum at Khewra, not only low down in the gorges, but high up towards the summit of the hills, showing the enormous riches of salt within. Red gypsum is a peculiar red coloured mixture of clay and crystallised gypsum. The Salt Range has been of absorbing interest to geologists who have for many years been doing a great deal of valuable work and have written numerous reports on it. There is a controversy amongst the geologists as regards the age of the salt strata. Some hold that the salt series belong to Cambrian age, others assign Tertiary (recent) age to them. In the Punjab, the salt strata underlie, without apparent unconformity, rocks of undoubted Cambrian age. The supporters of Cambrian age consider it a natural sequence ; those of Tertiary age consider this abnormal position to be the result of thrust faulting. It is beyond the scope of the present work to go into this question in detail.

(*c*) EXTENT AND WEALTH.

The Salt Range begins near Jalalpur on the river Jhelum and from there runs due west right across the Sind Sagar Doab (the land between Jhelum and the Indus) till it reaches the Indus. Then leaving at Kalabagh a narrow channel for the river to pass through, it crosses the trans-Indus region, till it meets at right angles the Suleman Range which runs from north to south. The height of the Range varies from 1,500 to 5,000 feet, the average being about 3,000. Its southern slope is steep and rugged, broken up by steep ravines and unfit for cultivation. The northern slope, on the other hand, is fertile and has a healthy climate.

Northern India has been endowed by nature in respect of her salt supplies in an abundantly generous manner. The Salt Range contains some of the richest deposits of rock salt in the world. The salt is found either cropping out in all directions or lying in strata beginning at the surface and extending downwards in deep veins. The exposures of salt marl appear very frequently for a distance of 134 miles. It occupies a breadth of 4 to 5 miles. The area of salt-bearing strata is

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about 600 square miles, in which the salt-zones vary from 100 to 275 feet in thickness. Salt is known to exist where the salt marl is fairly well exposed. Though nothing is known as to the manner in which salt, seams are laterally extended or terminated, the quantity of mineral must be enormous, if it is borne in mind that the solid contents of a bed of salt only 30′ thick and one square mile in area would be over 50,778,547 tons. The economic importance of the salt deposits is great as they produce about 1,40,000 tons of salt annually. Besides common salt, other salts useful in agriculture and industries, *e.g.*, potassium and magnesium salts are also found in small quantities in the Range. Deposits of coal are also known to exist in the Range. They are worked at Pid, Dandot, Chittidand and Makarwal. Besides gypsum, limestone and white and red clay, are also found in large quantities.

B.—KHEWRA.

(*a*) SITUATION, ETC.

The Khewra mine is on the southern declivity of the Range. It is the largest mine in the Punjab and is about 5 miles from the town of Pind Dadan Khan, a sub-division of the Jhelum district. The mine hill rises to a height of 700 feet above the level of the Khewra gorge at its side and 1,650 feet above sea level. There are five salt seams in the mine which are being worked and possibly two more which may be worked on further development. These seams vary in thickness both at different points and different levels and are in the aggregate from 270 feet to 700 feet thick. The seams which are being worked from top to bottom are :—

1. Buggy (North and Main),
2. Sujowal (Upper and Lower),
3. Pharwala-Upper,
4. Pharwala-Middle,
5. Pharwala-Lower.

The seams are separated by bands of pure marl or un-workable salt and sometimes by bands consisting of a mixture of other salts in which sodium sulphate, locally known as " Potash " predominates.

The total thickness of the saline strata is from 550 feet to 900 feet. Generally speaking the strata dip in a direction roughly 30° west of megnetic north at an average angle of about 45°. As the workings are progressing eastwards, however, it is becoming apparent that the seams roll over on a reverse dip in an approximately south-easterly direction. The length of the seams at present developed is over 4,000 feet, but the workings can still be extended horizontally. The depth of the strata is not known. There are large reserves of salt in the mine.

In colour the salt varies from pure white to deep red, but is remarkably pure in chemical composition. Even certain samples which look outwardly bad contain 98 to 99 per cent. of sodium chloride.

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The impurities are generally calcium sulphate and sodium sulphate. The specific gravity of salt is 2.13. A cubic foot salt weighs about one maund and twenty-five seers.

(*b*) RECENT SUBSIDENCE AND REMEDIAL MEASURES.

A subsidence, attributable to the erosion of salt seams below the original village site by water percolating through the bed of the gorge commenced in the monsoon season of 1925 and notwithstanding immediate measures to drain the fresh water over the threatened area by means of a flume and to level the gorge bed in order to reduce percolation, the subsidence persisted, though much more gradually, during the early part of 1926. The situation became very serious indeed during the monsoon season of that year, so much so as to endanger both the Low Level and the High Level entrances of the mine. During the early part of 1927, a drainage gallery was cut through the gorge bed at a level approximately the same as that of the Low Level Tunnel into which the gorge water had been percolating, and a powerful pumping plant was installed to deal with any water between the gorge and the mine which might not be dealt with by the drainage gallery. This work gave a qualified measure of success and practically stopped all subsidence, but evidence available from the experience of the monsoons of 1927 and 1928 showed that it was desirable to increase the depth of the gallery. This was done during the latter part of the year 1928 and early 1929, and though a relatively heavy monsoon occurred in 1929 and an exceptionally heavy one in 1933, very little water found its way into the mine. The situation has been reported by the Consulting Engineer to the Government of India as being reasonably secure. The mechanical drilling plant originally installed for exploratory borings to test the security of the low level tunnel is now used to explore the salt strata and to ascertain their dip and strike in various localities.

(*c*) SYSTEM OF MANUFACTURE.

(*i*) *Old system.*

In the time of the Sikhs many small mines were worked in various parts of the mine hill. These mines were approached from surface by numerous low winding tunnels and were abandoned as soon as marl was struck, the miners moving to new ground to start fresh mines. The Salt Department took over their administration in 1849 and made over the Engineering part of the work to the Public Works Engineer of the District and took steps to improve the communication from the surface to the mines. The small mines were closed and four of the best and largest mines—Sujowal, Makhad, Pharwala and Buggy—were selected for development and new tunnels were driven into them. The system of working then followed was somewhat antique, but great attention was paid to th eleaving of pillars to support the roof. Pillars, however, were not arranged on any definite system, but varied in thickness as well as in distance. Thomas Oldham, Superintendent, Geological Survey, who visited the mines in 1864 wrote, "when the mines first passed under British management, it is clear from the description given by those who had visited them, that they were in a greatly more neglected condition than now and that they were in fact only accessible with considerable difficulty and risk. The admirable works constructed under the direction of Mr. W. Purdon in 1854 and following years, by which the entrance to the mine was opened out, the streams bridged and a good road made to Pind Dadan Khan on the Jhelum, were the first great improvements and these tended to increase the trade in salt immensely ". The miners had to bring salt to the mine mouth and stack it in separate heaps. This system continued till 1872 when Dr. Warth introduced a system of continuous pillars and chambers. The miners were allotted spaces and paid by cubic foot. This system has gone on with some modification till the present day ; during these 60—70 years enormous developments have taken place.

(*ii*) *Present system.*

Since 1872 the mine has been worked from the top downwards. It is worked in a series of alternate pillars and chambers running parallel to the dip of the strata. The pillars are dividing walls between one chamber and the other and support the roof. The mine is served by eight levels running along the strike of the seams, the two upper ones being now worked out. There are tramways in four of the levels but only three of these are at present working at all vigorously. The principal level to which the salt is brought is known as the Low Level Tunnel : it extends for about 2,000 feet beyond the salt strata and opens in the Khewra gorge at a point about half a mile from the Khewra railway station on the North Western Railway system. The total length is over 6,000 feet and the whole of the salt removed from the mine is conveyed to the sale depot on the railway line across the gorge and about a quarter of a mile from the tunnel entrance in rakes of 25 tubs carrying a net load of 1,000 maunds per rake and hauled by electric locomotives to the depot. Collection of tubs from the branch tramways underground is partly done by electric locomotives with the help of their trailing cables and partly by mules. The ultimate aim is to eliminate system of collection by mules and to substitute collection by electric locomotives instead. Self-acting or gravity inclines and inclines served by an electric winch and an electrically operated endless rope haulage are used to lower or raise the salt to the main level. The mine is worked on a modification of the pillar and stall system, in a series of chambers which are constructed across the strata divided by walls or pillars which support the roof. These pillars increase in thickness from 25 feet at the top level to 35 feet at the low level, while the chambers decrease in the same ratio from 45 feet to 35 feet, the centre line of the chamber remaining fixed. In new blocks now being developed in the eastern districts of the mine the centres of workings are kept 100 feet apart at the present levels, the chambers and pillars both being 50 feet wide. These chambers are formed in the following manner :—

A tunnel is first driven into solid salt along the strike of the seam. From this main tunnel cross tunnels are driven at intervals of 100 feet at right angles to the main tunnel. The centres of the cross tunnels are the centres of the respective chambers. In the beginning, tunnels are about 7 feet high and 12 feet wide. They are then widened to the full width of the chamber that is 50 feet, a block of salt 50 feet thick

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being left between one chamber and the other. Miners blast the roof and bring it down till all salt finishes and roof marl appears. All salt is then taken out, and the chamber is then ready for 'par' or floor working. A vertical cut called 'Pachh' is made about 2 feet deep and 6 inches wide by pick work round the perimeter of the chamber. Holes are then drilled into the floor which is blasted away ; thus 2 feet depth is cleared and the process is then repeated. Chambers deeper vertically, till all salt is taken out and floor marl is reached. Huge chambers are thus formed. Some of the existing chambers are 800 feet long by 35 to 45 feet wide and over 200 feet high in pure salt. Some of them are filled with waste from other places. "Struts" are left to increase the stability of the mine where the roof is high. A 'strut' is a slab, say 30′ by 30′, left unworked in chambers to bind two pillars on both sides together.

Development work up to 1917 was all done by hand. In 1917 compressed air machinery was introduced. In 1925-26 an electric power house was installed. This consists of two 485 H. P. Diesel Engines manufactured by Messrs. Mirrles Bickerton ; two Metropolitan Vickers Alternators, generating 325 K. W. 3,000 volts alternating current (3 phase, 50 cycles), besides these there is a small 78 H. P. Engine driving a 50 K. W. alternator for night work. A proposal to replace the small set by a 75 K. W. set is under consideration.

The compressor plant consisted of two Bellis Morcom Vertical Compressors compressing 1,200 cft. of free air per minute to 75 lbs. per square inch. The compressor used to work 15 Hardy Punchers (Undercutting drill machines), 4 Jack-Hummers (boring machines) and two small pumps. This plant worked until 1934, but has since been closed. At present (June 1936) development work is being done by electrical cutters. Forward work by hand introduced about a year ago is also going on. The preenst electrical cutters are chain machines driven direct by electricity and are much more efficient than compressed air machines. An auxiliary unit consisting of four compressed air undercutters and two blast hole drilling machines is used in places which are not accessible or convenient for the electric cutters. Besides working the chain cutters, electricity forms the motive power for electric locomotives, ventilating fans, pumps and the Sullivan Diamond Drill (used for boring exploratory holes), an endless and a direct haulage, mechanical loading plant, for workshop and domestic lighting and fans.

Salt is transported from the working faces to the mine tramways by head loads. Until recently mule transport was used to bring the tubs to the collecting stations underground. The tubs were then marshalled into trains which were taken to the depot by steam locomotives. Electric traction was introduced in October 1934. Collection of tubs by mules in some parts of the mine still continues.

(*d*) STORAGE.

In olden times no stores existed. Salt was brought from the mine and issued to traders. Later on large covered stores were constructed in the depot. These were afterwards removed and big ramps and platforms were constructed. Storage in the depot was usually limited to three or four days' supply except during the monsoon period prior to the commencement of which approximately six weeks' supply was stacked in order to tide over the miners' vacation. With the introduction of the mechanical loading and crusher plant the old ramps are no longer in use. A ramp and a platform called the Reserve platform recently built are used for bagged consignments. The only storage that is possible on this platform is a week's supply. A stock of excavated salt, however, is kept in the mine itself.

(*e*) PRODUCTION.

The output of salt from the mine during the period 1849-50 to 1899-1900 is shown below for some typical years only. Since 1900-01 the output has been shown for each year :—

Year.	Output in lakhs of maunds.	Year.	Output in lakhs of maunds.
1849-50	2·09	1913-14	34·27
1854-55	7·53	1914-15	33·87
1859-60	7·68	1915-16	35·82
1864-65	8·77	1916-17	39·54
1869-70	11·68	1917-18	32·77
1874-75	11·36	1918-19	41·90
1879-80	13·28	1919-20	38·27
1884-85	13·89	1920-21	36·02
1889-90	20·00	1921-22	30·30
1894-95	15·97	1922-23	39·41
1899-1900	21·37	1923-24	13·28
1900-01	21·23	1924-25	36·98
1901-02	21·57	1925-26	20·14
1902 03	22·57	1926-27	27·67
1903-04	20·83	1927-28	26·96
1904-05-	25·40	1928-29	30·96
1905-06	23·08	1929-30	29·90
1906 07	23·97	1930-31	28·24
1907-08	23·73	1931-32	29·13
1908-09	25·74		
1909-10	29·52	1932-33	29·93
1910-11	26·82	1933-34	28·76
1911-12	31·49	1934-35	30·54
1912-13	31·99	1935-36	30·48

The output depends on demand. During 1914-18 (War period) there was a general shortage of salt due to stoppage of imports, and this resulted in increased demand and output of salt. During 1923-24 the output was low as the duty that year was raised from Rs. 1|4|- to Rs. 2|8|- per maund. Output since 1925 has been more or less constant. Until about 1921 about 14,000 maunds were excavated annually at the small neighbouring source of Nurpur.

(*f*) COST OF PRODUCTION.

The cost of production has varied from time to time. Prior to 1872 the miners were paid Rs. 4 per hundred maunds for salt which they had to bring to the mine mouth and stack in separate heaps. This was a primitive method. In 1872 Dr. Warth introduced the system of payment according to the cubical contents of the space excavated. It varied from Rs. 5 to Rs. 6 per hundred cubic feet for kathi work and was fixed at Rs. 4 for par work. This system continued till 1928 when payment on weighment basis was again introduced. The miners are paid for the salt they excavate on a weighment basis. In order to ensure rapidity of transport and simplicity of the payment account the men are originally paid at a fixed rate of Rs. 3-6-0 per tub of 40 maunds of salt delivered by them at the loading stations in the mine. To prevent loss to Government due to the impurity content which is invariably present in tubs loaded by the miners, the tubs are slightly overloaded. Accurate figures of the total quantity of salt cleared from the depot are balanced against the total amount of salt paid for under the above system. It generally happens that due to the overloading of the tubs a larger amount of salt has been cleared than has actually been paid for by Government, so at half-yearly intervals the necessary calculation is made and the excess amount distributed equally among the miners. This tub system has now been in vogue since October 1928 and has worked smoothly and satisfactorily. Besides the miners are also paid annas 4 a square foot for forward cutting with hand and annas 0|1|9 per cubic foot for excavation in marl. The cost of production including direct and indirect charges in 1935-36 was Re. 0-4-4.79 per maund.

(*g*) GROWTH OF KHEWRA TRADE.

It will be interesting to trace the growth of Khewra trade from the time the British took over the management of the mines to the present day. In olden days salt was brought to the depot by the traders themselves and issued to them after weighment. There was no railway at Khewra. It was, however, connected with Lahore by road and with Multan by road and river. Miani, a town on the left bank of the Jhelum, used to be a salt depot. All transport was on animals or on wheeled conveyances only. Up to 1879-80 salt was loaded at Gujrat, Lalamusa and Kharian. In 1880-81 a Government depot for the sale of Khewra salt was opened at Lalamusa, but this was abolished when the railway was extended to Khewra in 1882-83. Trade up to this time was subject to violent oscillations. With the extension of the railway, transport facilities increased and trade developed. A new system called the Through Traffic System was devised to facilitate the supply of salt to the public. Under this system merchants residing many hundred miles away and having no local

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agents at the salt source could obtain salt with no more difficulty and expense (freight charges, of course, excepted) than if the mines were at their doors. They had simply to deposit price, duty, etc., in a Government treasury and to despatch bags to the depot officer. The Railway which was metre-gauge in the beginning and necessitated transhipment on the way, was converted into broad gauge in 1884-85. Thence-forward the mines were in direct contact with all the chief markets of Northern India. From 1890-91 salt revenue could also be deposited in the Post Offices. The result of all these facilities and efficient management was that Khewra trade and with that the revenue developed. The revenue which was about rupees four lakhs during the Sikh regime is at present nearly fifty lakhs per annum.

(*h*) SYSTEM OF SALES.

The Credit system under which an indentor who deposited Government securities with the Commissioner, N. I. Salt Revenue was permitted to deposit revenue within six months of delivery of salt was abolished in 1932. At present salt is issued under the cash system only. Salt, other than that intended for retail sale within a protected area, may be obtained from the Khewra depot on pre-payment at an authorised treasury of all the necessary charges. An applicant for salt, not intended for retail sale within a protected area, is required at the time of presenting his application at an authorised treasury or sub-treasury to pay the duty on and price of the salt applied for at the rates respectively fixed and in force on the day when payment is made, together, when salt is required to be despatched in bags, with the cost of the bags to hold the salt, at such rates as the Commissioner may from time to time fix, and all charges in connection with the bagging, weighing, loading and despatching of the salt. As a trial measure the system of allowing traders to supply their own bags at the Khewra depot was put into force and the results have proved satisfactory. It is hoped that this system will now be adopted permanently. Indents for broad gauge destinations are accepted for bulk (unbagged) salt only ; but in the case of consignments intended for the Jammu and Kashmir State they are accepted for either bagged or unbagged salt as the indentor may desire. Indents for all destinations other than broad-gauge destinations are accepted for bagged salt only. An indent, which is non-transferable, when received by the Administrative Officer from the officer-incharge of the treasury or sub-treasury in which the revenue has been deposited, is checked and if found to be in order, an authority for the issue of salt is prepared and forwarded to the Superintendent in charge of the depot who loads the salt and despatches the railway receipt, freight to pay, by post to the indentor or other person named in the indent. Salt is weighed b ythe wagon load (550 maunds), each wagon, after having previously been tared, being weighed after filling on a railway wagon weighbridge. Government are responsible only for the delivery of salt to the railway, the railway receipt being a sufficient release for the quantity of salt consigned.

Formerly, the tramway from the mine ran into the depot on two ramps, and the salt on its arrival in tubs was dumped down the sides of these ramps on to loading platforms. Here the impurities and dust salt were removed and the salt was loaded in bulk into broad-gauge railway

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wagons ; consignments for metre-gauge destinations and for Jammu and Kashmir were bagged. The crushing and mechanical loading plant has now been completed. The salt of all consignments in bulk is automatically loaded into railway wagons by means of a car-dump, chutes, Ross feeder chains and conveyor belts, all worked electrically, only the bagged consignments being subjected to manual handling on the loading platform—called the reserve platform. The crusher portion of this plant was intended to pulverize rocksalt for sale in the Bengal market. Owing to extreme difficulty in obtaining sufficient labour for the Khewra Depot a Jail Camp was established in 1917 with the santcion of the Punjab Government.. The Reclamation Camp Jail ceased to function in March 1932. The work of bagging and loading salt is now done under contract.

(*i*) FARODIS.

Salt for retail sale within a protected area the storage of which may be permitted at any place within the limits of the area approved by the Assistant Commissioner, Salt Range Preventive Circle, Khewra is obtainable by persons known as farodis. A person desirous of becoming a farodi, if granted a licence by the Assistant Commissioner, Salt Range Preventive Circle, deposits in an authorised treasury or sub-treasury the charges on the quantity of salt he requires and on presentation of the treasury receipt for the money deposited, is given an authority having a currency of 21 days and is required to dispose of the salt within 4 months, such authority bearing an endorsement that the salt it covers is intended for retail sale within the protected area. The farodi when he has provided himself with a register in which he is required to enter his daily sales, has his salt weight for removal to the place where it may be stored and retailed by him. A licence may be cancelled, and withdrawn at the discretion of the Assistant Commissioner, Salt Range Preventive Circle, if the farodi fails to comply with rules or if there is reasonable suspicion that he is acting in contravention of the provisions of the Salt Act.

(*j*) SELLING PRICE.

The selling price was raised with effect from the 15th July 1929 from 3 annas 6 pies per maund to 4 annas six pies per maund excluding despatch charges of 6 pies per maund which were reduced to 3 pies per maund from the 1st October 1935. The selling price has been reduced from the 1st April 1936 from 4 annas 6 pies to 4 annas 3 pies per maund. Thus the total selling price including despatch charges these days is 4 annas and 6 pies per maund. The bags or in the case of bulk salt the wagons at Khewra taking consignments for destination in the Jammu and Kashmir State are required to be sealed with a lead seal bearing the British Coat of Arms. This necessary sealing is done by a contractor on whose behalf the Administrative Officer obtains pre-payment from the indentors of the charge due. An indentor on Khewra whose salt is despatched in bags belonging to Government at present pays for bags at 4 annas per bag. The duty, price and other incidental charges are levied at the time when the indent is presented in an authorised treasury or sub-treasury.

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(*k*) ISSUES AND DISTRIBUTION.

The issues of Khewra salt since 1910-11 and its distribution—as far as that can be ascertained—are shown in the table below :—

[In lakhs of maunds.]

Year.	N. W. F. Province.	Kashmir.	Punjab.	United Provinces.	Bihar.	Bengal.	Total.
1910-11 ..	·48	·94	19·45	5·52	1·38	·03	28·39
1911-12 ..	·58	1·03	19·87	5·93	1·68	·03	29·99
1912-13 ..	·38	·89	20·06	6·39	1·71	·04	30·57
1913-14 ..	·93	1·05	20·75	6·01	1·75	·05	31·15
1914-15 ..	2·32	·98	21·35	7·18	2·84	·09	34·98
1915-16 ..	1·90	1·03	17·26	8·54	6·44	·30	35·48
1916-17 ..	1·37	1·28	17·48	8·49	8·96	·92	38·60
1917-18 ..	1·56	·77	18·47	5·78	5·16	·48	32·36
1918-19 ..	1·73	1·13	18·86	6·50	14·34	·63	43·62
1919-20 ..	1·33	·93	19·26	4·33	12·09	·07	39·00
1920-21 ..	1·89	·98	16·02	3·08	10·76	·02	33·05
1921-22 ..	·97	·84	16·69	4·42	5·67	·08	28·90
1922-23 ..	2·11	1·24	21·96	3·45	9·05	·26	38·40
1923-24 ..	·63	·69	9·20	1·23	1·08	·06	13·00
1924-25 ..	1·45	1·40	24·97	3·44	6·99	·18	38·54
1925-26 ..	·68	1·19	12·55	1·92	4·84	·18	21·4
1926-27 ..	1·95	·97	16·86	2·06	5·91	·23	27·98
1927-28 ..	2·06	1·36	15·21	2·09	6·46	·22	27·40
1928-29 ..	2·70	1·82	16·62	1·86	7·31	·29	30·60
1929-30 ..	1·94	1·56	17·13	1·69	7·11	·30	29·73
1930-31 ..	2·01	1·55	15·90	1·87	5·75	·31	27·39
1931-32 ..	2·52	1·73	15·85	2·05	6·50	·28	28·93
1932-33 ..	3·44	1·66	15·60	1·58	7·19	·31	29·78
1933-34 ..	2·68	1·83	15·64	1·65	6·72	·33	28·85
1934-35 ..	3·22	1·90	15·89	1·43	7·35	·15	29·94
1935-36 ..	3·33	1·90	16·68	1·35	6·77	·13	30·16*

*This does not include ·08 issued to Bombay, Sind, Central Provinces, etc.

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Khewra rocksalt, except where it is ousted by Mandi salt in the Kangra and Kulu valleys, parts of the Hoshiarpur and Gurdaspur districts and the hill States near the Mandi sources or has to share the market with Sambhar and Didwana in districts bordering on Rajputana, holds the whole of the Punjab, disputes with Kohat about one-fifth of the North-West Frontier Province and is also exported to Kashmir. Popular everywhere with orthodox Hindus, it has a considerable though uncertain vogue in the United Provinces and finds its way in small quantities even to Bengal and Bombay. In Bihar, where during and immediately after the war it secured and to some extent still retains a notable market considerably larger than in the United Provinces, its limit is determined by the freight charges, and the chance of its ever being able unassisted to compete east of Patna with Calcutta imports is remote.

(*l*) OTHER INDUSTRIES AT KHEWRA.

Quarrying of gypsum has been going on as a subsidiary industry at Khewra for some years. About five to six thousand tons are annually excavated and despatched from Khewra. The work of excavation and despatch is done by a contractor under departmental supervision.

The Imperial Chemical Industries have taken a lease of some areas near Khewra from the Punjab Government. They have also entered into an agreement with the Government of India to take and utilize waste salt and marl from Khewra at a nominal price. They intend to start a soda ash factory and may ultimately make other chemicals as well. The firm have not yet started operations, though they have been making preliminary investigations for some time.

C.—WARCHA.

(*a*) SITUATION.

The Warcha mine is situated in the Shahpur district at a distance of 9 miles rrom the North-Western Railway station Gunjial and about two miles north-west of the Warcha village. The exact locality of the mine is known as Rukhla or Warcha Mandi. The mine, the salt of which has gained wide popularity owing to its attractive colour and its purity is much smaller than the Khewra mine, but has been considerably developed in recent years. The workings to the east, west and north would appear to be cut off by faults of some magnitude, but within the area enclosed by these faults is a deposit sufficient in quantity to supply the present demand for at least 50 years, possibly longer. The mine workings are being developed to the west, but the fault has not yet been encountered.

(*b*) MANUFACTURE.

(*i*) *Old system.*

The mine came under British rule in 1849-50. Up to 1885 the old system of working prevailed. Large chambers of irregular size and direction with supporting pillars of varying sizes and varying distances apart were excavated. The whole of the old workings formed a large chamber about 720 feet long and from 140 to 360 feet wide, supported by 60 salt pillars the most of which were about 12 feet square, but a few were as small as 8 ft. × 6 ft. and a few as large as 68 feet × 24 feet. A part of the large old works excavation 440 feet long and from 100 to 200 feet wide

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was only supported by the sides of the excavations and five small pillars about 12 feet square all of which were crushed in. This large unsupported excavation had its greatest length along the strike which was not desirable. The weight of the superincumbent strata crushed in the pillars which were too small to support it. So this part of the mine became unsafe and was abandoned. From 1884 preparations were made for the adoption of the new system ; the old one was finally discarded in 1891 when the new system was fully introduced.

A barrier pillar of salt about 50 feet thick was left between the old workings and the first new working. Steps were also taken to pack up the old workings with waste material to make them safe. A continuous pillar system as at Khewra was introduced. 25 feet thick pillars were left and 45 feet chambers were worked. The long axis of the pillars was along the dip as at Khewra. The second entrance to the mine was completed in 1900.

(*ii*) *Present system.*

This mine is at present being worked on the same scientific principles as the Khewra mine, of which this can be called a small replica. The mine is served by two main tunnels, the High Level Tunnel and the Low Level Tunnel. The former is situated about 75 feet above the latter ; a surface self-acting incline brings the salt to the low level. There is also an Incline Tunnel about 30 feet above the Low Level Tunnel. A second self-acting incline is installed underground to bring salt from this tunnel to the low level. The mine has much developed in recent years. The main tunnels, about 2,000 ft. in length each are being pushed forward. For many years only the uppermost two seams having an aggregate thickness of about 20 ft. with a band of marl one foot thick in between, were worked. Three or four other seams exist below these. The total thickness of the seams is over 100 feet. The seams in the Warcha mine are of excellent quality and there is less intermingling of marl with salt than is the case at Khewra. All work was done by hand up to 1923-24 when a compressor plant was installed. Since then development work is done with Hardiax Punchers. The system of ' Hand kathis '—forward work with hand has also been introduced. The mine has about 31 chambers at present, but development to the west is going on, which will open up more chambers. A new Low Level Tunnel opening much nearer to the depot is under construction. This will decrease the haulage lead to about half and facilitate clearances.

(*c*) STORAGE.

No stores exist at Warcha. The tubs as they come from the mine are emptied into the Railway wagons.

(*d*) PRODUCTION.

The output from the Warcha mine has varied from year to year. The following table gives the output from 1849-50 onwards :—

Year.	Output in lakhs of maunds.	Year.	Output in lakhs of maunds.
1849-50	0·22	1864-65	1·24
1854-55	0·40	1869-70	1·33
1859-60	1·30	1874-75 .. .	1·03

Year.	Output in lakhs of maunds.	Year.	Output in lakhs of maunds.
1879-80	1·02	1916-17	2·81
1884-85	1·44	1917-18	2·79
1889-90	1·38	1918-19	3·09
1894-95	1·05	1919-20	4·34
1889-1900	1·02	1920-21	2·72
1900-01	1·93	1921-22	5·21
1901-02	1·08	1922-23	5·42
1902-03	1·02	1923-24	4·68
1903-04	1·24	1924-25	12·50
1904-05	1·41	1925-26	8·92
1905-06	1·53	1926-27	5·45
1906-07	1 67	1927-28	5·47
1907-08	1·78	1928-29	6·52
1908-09	1·70	1929-30	5·28
1909-10	1·83	1930-31	6·11
1910-11	1·52	1031-32	6·59
1911-12	1·59	1932-33	6·71
1912-13	1·59	1933-34	6·74
1913-14	1·30	1934-35	7·30
1914-15	1·44	1935-36	6·78
1915-16	1·46		

The output depends on demand. Enhancement of duty from Rs. 1|4|- to Rs. 2|8|- accounts for low output during 1923-24. Record output during 1924-25 and high output during 1925-26 were due to sudden demand owing to reduction of duty to Rs. 1|4|- ; since 1926 the output has been more or less constant due to fixed clearances.

(*e*) COST OF PRODUCTION.

In olden days each miner had to deposit his salt at the mine mouth. He was paid Rs. 3|12|- per hundred maunds. The miners had to pay one anna and 3 pies per hundred maunds to men known as "Dharwais" who weighed their salt when filling into the traders' bags. Afterwards payment by cubic foot of space excavated was introduced. This system continued till 1928-29 when the system of payment on a weighment basis was introduced. Tubs of a standard tare are used, these being loaded underground and brought down to the depot where they are weighed and the weighment also serves the purpose of issue to the trader. The miners are paid Rs. 3|12|- per tub of 50 maunds, the rate paid works out to 1.2 annas per maund of salt delivered. Six monthly adjustments for excesses or deficits are made on the basis of clearances from the depot as at Khewra. Excavation in marl is paid at Re. -|1|9 per cubic foot. Forward work with hand is paid at annas 4 a square foot. The transport contractor who now handles all the salt from the time of its being loaded into the mine tubs to the time of its being loaded into the railway wagons is now (1936-37) paid

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a rate of annas 0-12-6 per 100 maunds of salt cleared from the depot. This is the current rate. The cost of production based on both direct and indirect charges was 3 annas 4,46 pies per maund in 1935-36.

(*f*) DEVELOPMENT OF WARCHA TRADE.

In olden days, the miners delivered salt at the mine mouth from where it was filled by traders in bags and brought to the weighing house. Most of the salt was taken on camels to Khushab at a distance of twenty-six miles, from where it was despatched either by rail or road or river. Warcha was handicapped, as it had no railway station, Gunjial the nearest railway station being 9 miles away. Hence it could not compete with Khewra and Kalabagh. Salt was exported to Jhang, Jhelum, Bhakkar, Leia and Muzaffar Garh. N.-W. Railway's branch was extended to Warcha in 1917. Thenceforward Warcha salt began to gain popularity. The clearances in 1924-25 rose to 12 lakhs of maunds. As this increased demand was embarrassing owing to the limited capacity of the mine, in 1926 the clearances were restricted to 4 wagons a day or about 6-7 lakhs of maunds per annum.

(*g*) SYSTEM OF SALES.

(*i*) *Old system.*

Formerly salt was issued under the ordinary system still in vogue at Khewra. But as the indents received were far in excess of the normal supply from the mine, the treasuries were directed to accept indents for Warcha salt for a few days only. During these days indents enough for the whole year were received. This system was found defective as traders suffered loss of interest on the money deposited. Since 1926, the output has been restricted to 100 wagons per month. With a view to checking over-indenting and at the same time ensuring an equitable distribution of salt among all indenters, large and small, a new system of indenting was introduced in 1930. The quality of salt available for issue each month was notified in advance. No individual or firm could apply for more than 25 per cent. of the month's supply. Persons indenting for one wagon load only were termed as small indentors and other as large indentors. The total supply was first distributed among large and small indentors by rule of three. The share of each of the large indentors was fixed on *pro-rata* calculation, while that of the small ones was determined by lots. Each indentor was then informed of the number of wagons he got and asked to send in his indents accordingly.

(*ii*) *Present system.*

Indenting on the source was very heavy, often applications for three, four, or even five hundred wagons were received against a fixed clearance of one hundred wagons. Some traders kept their unallotted indents for the next month, some had the revenue refunded, but most of them had them transferred to Khewra. Heavy transfers of indents to Khewra meant trouble. So the system mentioned above was abolished from October 1935. This has been replaced by another under which a trader before depositing revenue applies for allocation of salt wagons on a prescribed form which can be had from the Superintendent's office at Re. 0-8-0 each. A trader cannot apply for more than 25 wagon-loads at a time. On the fourth of every month (or the 5th if 4th is a holiday) lottery is drawn for 100 wagons and the lucky numbers are asked to deposit the revenue. Salt is cleared in the order in which the hundred numbers are drawn in the lottery.

The carriage of salt contractor brings the tubs to the depôt where they are weighed on a weigh-bridge. After weighment the tubs are run on to the railway platform. They are tipping tubs and are easily unloaded on to the loading chute one end of which leads into the wagon. Any impurities, marl, etc., are taken out and an equal quantity of salt is put into the wagon. To ensure uniformity in the issues of salt a system of coloured discs exists. The first two tubs are sent to the first wagon, the following two to the next and so on till all the four wagons have two tubs each. This cycle of operaions is repeated till each wagon has had 11 tubs or 550 maunds of salt. The system of farodi sales is the same as at Khewra.

(*h*) Selling price.

The selling price excluding despatch charges was raised from the 15th July 1929 from 3 annas 6 pies to 4 annas 6 pies per maund and has been reduced from the 1st April 1936 from 4 annas 6 pies to 4 annas 3 pies per maund. The despatch charges were reduced from 6 pies to 3 pies per maund from the 1st October 1935. Thus the total selling price including despatch charges these days is 4 annas 6 pies per maund.

(*i*) Issues and Distribution.

The issues in recent years have been as follows : —

Year.	Lakhs of maunds.	Year.	Lakhs of maunds.
1910-11	1·53	1923-24	4·53
1911-12	1·60	1924-25	12·62
1912-13	1·56	1925-26	7·74
1913-14	1·32	1926-27	6·59
1914-15	1·42	1927-28	6·17
1915-16	1·32	1928-29	6·54
1916-17	2·80	1929-30	5·28
1917-18	2·69	1930-31	6·11
1918-19	2·52	1931-32	6·59
1919-20	4·11	1932-33	6·71
1920 21	2·95	1933-34	6·74
1921-22	5·39	1934-35	7·30
1922-23	5·27	1935 36	6·78

It will be seen that while the average sales were formerly under 4 lakhs, they jumped to 12.62 in 1924-25 (owing to reduction of duty) and remained as high as 7.74 lakhs in 1925-26. Warcha salt is sold almost entirely in the neighbouring districts of the Punjab such as Multan, Lyallpur, Jhang, Shahpur, etc. Some salt also goes to Bahawalpur and Patiala States.

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D.—KALABAGH.

(*a*) HISTORICAL.

Kalabagh has salt quarries which have been worked from times immemorial. Dr. Jameson of whom mention has already been made, gives an account of these in his report published in 1843. The quarries were famous for novelty and were visited by travellers who told of the wonders of the town and of houses built of salt and roads cut in solid salt. Thomas Oldham saw them working in 1864. Besides salt, alum industry flourished at Kalabagh in olden days. About 7,000 maunds of alum were annually extracted from pyrites shale. Imports of cheap European alum, however, destroyed this industry.

(*b*) SITUATION.

The salt quarries are situated on the right bank of the Indus towards the north east of the town of Kalabagh at a distance of about two miles from it. The town of Mari is almost directly opposite on the left bank. The quarries are open excavations on the eastern face of the Saudagar hill. A mine also is being developed.

(*c*) GEOLOGICAL.

Between the quarries and the Kalabagh town both situated on the right bank of the Indus, there is a high hill ; on the right there is a great gorge flowing into the Indus and on the left of the gorge is the salt depot. Higher up, the right bank of the river is occupied by hill ranges. On the left bank, we have a continuation of the hill ranges of the right bank opening out into a plain space occupied by the town of Mari. Mari salt hill extends beyond this and down below the Indus valley spreads into a large plain. All the mountain and hill ranges visible from Mari are tertiary ossiferous sand-stone strata and conglomerates. They correspond with the eastern Salt Range and are associated with salt formations. Salt strata outcrop below on the foot of the hills. The Mari hill rises as an irregular mass surrounded by tertiary hills. This is 2 miles in circumference on the outside and it appears to be a mixture of salt marl and gypsum.

(*d*) MANUFACTURE.

The strata at Kalabagh have been so much contorted that salt is found in isolated masses of varying sizes and varying degrees of purity and texture. Many salt seams are found at different places, varying in thickness from 4 to 20 feet. Seams thin out rapidly sometimes reappearing, sometimes dying away. The strike of the salt formation is from south to north. The dip varies greatly from very nearly horizontal to vertical. Till recent years no definite system of excavation has been followed. In fact owing to the irregularity of the seams and distortion of the strata, a regular system of mining is not practicable. Each working has been, as it were, in the form of a newly started quarry in the side of the hill. Formerly salt was excavated by first taking off the outer crust and the covering marl. As quarrying began to prove expensive and dangerous owing to overhanging rocks, it was thought advisable to work a mine. The mine is on the right bank of the Indus in the hill (which here drops sheer into the river) on the west of the Luni gorge close to but on the far side

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from the town of Kalabagh. Owing to there being no regularity in the seams, no uniform system of alternate chambers and pillars is possible and excavation from the mine follows the seams of salt which bend and fold considerably. Excavation is done entirely by hand for there is no mechanical power inside this mine.

Exploratory drifts are being driven in the Kalabagh town area. If, as is anticipated, they prove successful, the workings will be transferred to this side and salt transported direct to the Railway line, a bridge having been constructed by the N.-W. R. across the Indus.

(*e*) STORAGE.

Formerly miners' payment included carriage of salt to the depot, but now the latter work is done by a contractor. There is no tramway for the removal of salt which is here conveyed across the stony gorge by pack animals to a sale depot at Kukranwala Wanda on the right bank of the Indus. The bullocks or donkeys pass on to a narrow raised platform from which the salt is emptied into wagons. The wagon is then weighed on a weigh-bridge out of which the salt is tilted out on to the storing ground below. The miners are paid on this weighment.

A certain quantity of marl is always received from the mine, and to cover this 2½ per cent. extra is taken from the miners. The weighment officer weighs 25 maunds and 25 seers into each wagon, the miner, however, is paid Rs. 2|7|7 for 25 maunds at Re. -|1-7 per maund. There is considerable trouble at Kalabagh over variations in the quality of the salt, as some of it is pure white and some pink. In general the salt is of good quality, it is red, homogeneous, hard, compact and fine-grained. The weighment into store is conducted by an Inspector.

(*f*) PRODUCTION.

The output from Kalabagh has varied from time to time as will be seen from the following table :—

Year.	Output in lakhs of maunds.	Year.	Output in lakhs of maunds.
1849-50	0·06	1903-04	1·94
1854-55	1·09	1904-05	2·28
1859-60	0·65	1905-06	2·69
1864-65	0·49	1906-07	3·09
1869-70	0·54	1907-08	3·14
1874-75	0·64	1908-09	3·38
1879-80	0·76	1909-10	2·30
1884-85	0·82	1910-11	3·05
1889-90	0·29	1911-12	3·25
1894-95	0·77	1912-13	2·88
1899-1900	1·53	1913-14	2·30
1900-01	1·32	1914-15	3·14
1901-02	1·60	1915-16	3·02
1902-03	1·54	1916-17	3·81

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Year.	Output in lakhs of maunds.	Year.	Output in lakhs of maunds.
1917-18	3·17	1927-28	3·39
1918-19	2·94	1928-29	4·32
1919-20	1·36	1929-30	4·06
1920-21	1·36	1930-31	4·00
1921-22	3·76	1931-32	4·03
1922-23	3·91	1932-33	3·51
1923-24	0·96	1933-34	3·89
1924-25	2·54	1934-35	3·81
1925-26	1·56	1935-36	3·86
1926-27	3·01		

(*g*) COST OF PRODUCTION.

The miners, as already stated, are paid at the rate of Rs. 0-1-7 per maund extracted. The transport from the mine to the depot is done by a contractor, the present (1936-37) rate being 5¼ pies per maund for carriage of salt plus ½ pie per maund for separation of impurities. The other charges entering into the cost of production, *viz.*, interest on capital expenditure and establishment, are very small. The source works at a small profit. The cost of production during 1935-36 including direct and indirect charges was Re. 0-3-11.46.

(*h*) SYSTEM OF SALES.

Applications are invited on the prescribed form which can be had for 8 annas from the office of the Superintendent, Kalabagh. From the quantity fixed for clearance in any month one third is reserved for boat trade on the river Indus and only firms registered for this purpose can put in applications for boat salt. In case the applications received are in excess of the quantity fixed for clearance, the allotment is made by a draw which determines the order of clearance and names of the successful applicants. If the applications received are within the quantity fixed for clearance in any month, they are accepted in full. Usually applications far in excess of the quantity fixed are received. The applicants whose applications are accepted in the above manner are then required to deposit salt revenue in any of the authorised treasuries. Indents are received by the Superintendent and authorities to issue salt prepared.

The trader is usually present while the salt to be issued to him is weighed into store. After it has been weighed and thrown on to the storage platform, the salt is cleaned and loaded direct into boats if it is small salt or if it is going by rail. If it is going by river to Sind, large blocks are usullay issued. They are piled into tip wagons which are pushed along the railway line to the weighment shed where the weighment is made by the Superintendent. The merchant is then responsible for loading the salt into barges which carry it across the river to the railway if it is to be sold in the Punjab, or down the river in boats if the salt is proceeding to Sind.

(*i*) SELLING PRICE.

The selling price has with effect from the first April 1936 been reduced from 4 annas 6 pies to 4 annas 3 pies per maund, the merchant making his own arrangements for bagging and removal.

(*j*) ISSUE AND DISTRIBUTION.

As at Khewra and Warcha the output and issue figures do not much vary. The issues since 1910-11 have been as follows :—

Year.	Issue in lakhs of maunds.	Year.	Issue in lakhs of maunds.
1910-11	2·99	1923-24	0·83
1911-12	3·21	1924-25	2·16
1912-13	2·54	1925-26	1·58
1913-14	2·58	1926-27	3·35
1914-15	3·18	1927-28	3·41
1915-16	2·96	1928-29	4·34
1916-17	4·00	1929-30	4·14
1917-18	3·16	1930-31	4·00
1918-19	2·15	1931-32	4·03
1919-20	1·59	1932-33	3·51
1920-21	1·91	1933-34	3·89
1921-22	3·76	1934-35	3·80
1922-23	3·42	1935-36	3·86

In olden days there was no railway at Kalabagh. The railway was extended to that place in 1894-95. Prior to this salt used to go to Makhad, Hazara, Bannu, Rawalpindi and Dera Ghazi Khan. Sukkur depot was opened in 1893-94 and salt used to go there from Kalabagh down the river Indus. Some salt (about 40,000 maunds) still goes to Sind. Salt also goes to Mianwali, Multan and Muzaffar Garh as well as to some portions of the North West Frontier Province, and to Bahawalpur State, Delhi and U. P.

E.—PREVENTIVE MEASURES.

The mining, quarrying and storing of salt in the Salt Range Division are conducted under departmental supervision, but the revenue is not collected by the Salt Revenue staff who have absolutely no cash transactions of any kind with traders. The duty, price and other charges are collected on the presentation of indents at treasuries, sub-treasuries, and a few post offices authorised to do so, and are all prepaid. Salt is issued only under authorities signed upon the actual indents by the Administrative Officer, Khewra or the Superintendent in charge of the source. The depot and mine entrances at Khewra, Warcha and Kalabagh are guarded by Jemadars and peons. At Kalabagh only sufficient salt to meet indents for the following day is brought from the mine. The quantity issued one day apart from wastage is thus exactly equal to the quantity paid for on the previous day. There is thus an excellent internal check on issues and little danger of any loss of revenue. To prevent salt being stolen on its way from the mine to the depot, sentries have been posted on the surrounding hills. The posts are periodically inspected by the Superintendent in charge. The outcrops of salt all over the Range are guarded by the peons and Jemadars stationed at the guardposts near the outcrops. There are four purely preventive circles under Inspectors, *viz.*, Khewra, Malote, Nurpur and Katha. Warcha and Kalabagh are manufacturing as well as preventive circles under Superintendents. Up to 1st April 1935 preventive work was under the Assistant Commissioner, Sales, subject to the general control of the General Manager. Since 1st April 1935, however, preventive work has been placed under the Assistant Commissioner, North West Preventive Division, Kohat. The Salt Range Preventive Circle is a circle of this Division. Removal of salt from outcrops was permitted in 1931 under the Delhi Pact, but as the concession was grossly abused, it was withdrawn. Maunfacture of earth salt in the Dera Ghazi Khan district is not permitted except under the Delhi Pact. A preventive establishment is stationed there. During 1933-34, 15 seizures were effected and 30 persons were awarded punishment by the courts. During 1934-35 there were 31 seizures and 29 persons were convicted.

F.—HISTORY OF ADMINISTRATION.

As already mentioned, the mines came under the British sway after the Sikh Wars and annexation of the Punjab in 1849. The British Government abolished all customs duties in the Punjab from first January 1850. Only salt remained subject to an excise duty. In 1851 a Collector was placed in charge of the mines. He had a deputy Collector, Patrols, Assistant patrols, etc., under him. He was under the Commissioner of Jhelum. In 1869-70 the Punjab Salt and Customs Department was amalgamated with the Inland Customs Department. In 1882, the Northern India Salt Revenue Department took the place of the Inland Customs Department. An Assistant Commissioner was in charge of the Division which was known as the cis-Indus and Kalabagh Mines Division. The Division is now called the Salt Range Division. Up to 1st April 1935 the Salt Range Division was one of the four Divisions of the Northern India Salt Revenue Department. It was under a General Manager. The Khewra Mine was under an Assistant Commissioner who was the manager of the mine and the sales section was under an Assistant Commissioner.

The staff of the Northern India Salt Revenue Department has recently been re-organised. The Re-organisation Scheme took effect from the 1st April 1935. The technical side of the work in the Salt Range Division is now under a Chief Mining Engineer (Pay Rs. 1,000—50—1,400 + £30 overseas pay) and the administrative and sales work under an Administrative Officer (Pay Rs. 700—25—900 + Rs. 150 S. P.). The electrical and mechanical plant is under the immediate control of a Superintending Engineer (Pay Rs. 1,300). The Khewra mine is under the Mine Manager (Pay Rs. 700—50—1,100) and Warcha and Kalabagh mines under Superintendents (Pay Rs. 250—50|3—600 with special pays of Rs. 100 and Rs. 50 respectively). A Superintendent holds charge of the Khewra Depot. He is subject to the general control of the Administrative Officer. Superintendents in charge of mines at Warcha and Kalabagh also attend to the Sales and Preventive work at these two places. The preventive work which was hitherto under the Assistant Commissioner, Sales and General

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Manager has been separated from the Manufacturing Division. A new Division called the North West Preventive Division has been formed under an Assistant Commissioner with his headquarters at Kohat. The preventive work of the Salt Range Division has been transferred to his control. A circle called the Salt Range Preventive circle has been formed. This circle consists of the districts of Ferozepur, Amritsar, Lahore, Gurdaspur, Sialkot, Gujranwala, Sheikhupura, Gujrat, Jhang, Jhelum, Lyallpur, Shahpur, Montgomery, Mianwali and Muzaffargarh in the Punjab. This circle is at present under a supernumerary Assistant Commissioner. As soon as this post is absorbed, a Superintendent will hold charge of this circle and will be under the Assistant Commissioner, Kohat. All preventive expenditure is debited to the new preventive Division.

Inspectors (Pay Rs. 80—4—140—5|2—160) hold charge of four purely preventive circles—Khewra, Malote, Nurpur and Katha—and are under the Assistant Commissioner, Salt Range Preventive Circle. An Inspector with his headquarters at Lahore supervises the salt-petre refineries, etc., and the operation of the rules for the refund of duty on salt used for industrial purposes. A Deputy Superintendent with his headquarters at Rajanpur attends to preventive work in the Dera Ghazi Khan district. They are also under the Assistant Commissioner, Salt Revenue Preventive Circle.

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CHAPTER VI.

Kohat Salt Quarries.

(*a*) HISTORICAL.

The Kohat salt quarries came under the control of the British Government, when they annexed the Punjab in 1849 after the Sutlej campaigns. The English found the Punjab and Kohat mines being exploited so far as the State Exchequer was concerned. The Kohat mines or quarries were held by turbulent mountaineers who would not submit to taxation in any substantial form. The farming system as in the Punjab did not operate there. Instead the salt quarry was surrendered to some local chieftain in lieu of nominal tribute. Lt.-Colonel Bruce writing in 1865 said, " During the Sikh Government, no attempt was ever made to manage the trans-Indus Salt Mines, of which there are four. They were held by fierce mountaineers, the rashest speculator would have no concern with them, and even the Sikh Government would have had to collect the revenue by the force of the sword. The Mines were, therefore, held by local chieftains, on payment of an annual (and I fancy, nominal), tribute ". The old rates of duty at the mines were very low, varying from an anna a maund at Jatta, Malgin and Nari to 6 pies a maund at Bahadurkhel. On annexation these rates were raised to uniform rate of Re. 1 per maund which led to disturbances in the south of the district. So in the beginning of 1850, the British Government imposed light duties of 2 to 4 annas a maund and allowed certain perquisites to local khuttuck chiefs with a view to reconcile the hill chiefs to the new system.

In 1851 in order to guard against the influx of this lightly-taxed salt across the Indus to the detriment of salt revenue derived from the cis-Indus mines, a system of prevention was introduced. Under this system parties were stationed at each ferry on the eastern bank of the Indus from Attock on the north to Leia on the south, controlled and watched by a roving party constantly moving up and down the line, the establishment on the upper portion of the line between Kalabagh and Attock being superintended by one officer and that on the lower portion between Kalabagh and Leia by another. This developed into the Indus valley Preventive Line. The line was over 500 miles long and did not extend above Attock on the Indus, but salt had to pay town duties at Peshawar. The Commissioner of the Rawalpindi Division was in charge of its management. The salt of trans-Indus mines was contraband to the east of the Indus, though manufacture of salt in Derajat and the consumption of salts other than Government salt was not prohibited.

These mines were worked more on political than financial considerations. Bruce even considered the trans-Indus system as lying outside the Indian system for all practical purposes because of marked difference in the scale of levy. The difference can be easily explained. The tax was such a sore point with trans-Indus people and opposition to any attempt at raising it was so violent, that British officials were forced to deal gently with the hill man. " One of the worst wars we had on the border rose from that very circumstance " (of an attempt to raise the duty beyond the Indus) stated Lawrence before the 1873 Select Committee on East India Finance, and he went on to describe how the whole country-side was up in arms in consequence of one such attempt and how a District Collector and his Assistant were murdered in consequence of another. It was indeed tantamount to putting a premium upon lawlessness, but then, that is about all that could be said of it.

Writing in 1864 Thomas Oldham, Superintendent of Geological Survey, after his examination of the Kohat mines said, " At present the Government appear to me to be in the anomalous position that they work the mines and yet do not work the mines ; that they sell the salt and yet do not sell the salt (for others get the money) ; and that they levy or collect the tax and yet allow other taxes to be imposed also ".

About 1869-70 only five mines were working—Jatta, Malgin, Nurree, Karak and Bahadurkhel. Government formally took charge of them in March 1870. Purchasers made their own arrangement with the miners for excavating salt and then paid to Government a duty of annas 0-4-0 a maund at Jatta, Malgin and Nurree, 3 annas at Karak and 2 annas at Bahadurkhel. The Deputy Commissioner, Kohat, looked after the mines. Allowances were paid to certain Mullicks or petty Chiefs as compensation for proprietary rights. In the beginning the mines were a source of loss. During 20 years from 1849 to 1869 Government incurred a net loss of £8,000, what to say of getting any revenue from 20,00,000 tons of salt supplied. Some people considered that the mines were a source of strength while Mr. Hume, Commissioner, Inland Customs, held contrary views. In his Administration report for 1869-70 he said, " As a matter of fact I submit that so far from having been any source of strength, these mines, owing to misconception in the mode of dealing with them, have been the cause of loss of prestige, and hence a source of political weakness. The tribes have learnt to believe that we dare not demand from them a fair price for our own salt ". Mr. Hume recommended increase of duty to 6, 4½ and 3 annas from 4, 3 and 2 annas respectively. An English officer, a Superintendent of the Northern India Salt Revenue Department, was first posted to the mines in 1889-90. Even when the Inland Customs Line was abolished, the Indus Preventive Line was retained, as the duty on Kohat salt was still much lower than that on Punjab Salt. The duty in Kohat fluctuated from time to time ; in the beginning the duty on Jatta, Malgin or Nurree salt was 4 annas a maund, on Karak salt 3 annas, and on Bahadurkhel salt 2 annas a maund. In 1883 a uniform duty of 8 annas a maund (102 17|28 lbs.) was imposed on all salt produced at the mines. The enhancement was insufficient to check smuggling across the Indus. It was considered inexpedient to equalize the duty on trans-Indus and Cis-Indus salt, and so preventive arrangements were continued under Act XIX of 1890. The Line from Torbela was at the same time extended to the northern part of Hazara District and Kashmir. With effect from the 13th of July 1896 the duty on Kohat salt was raised to Rs. 2 a Kohat maund of 102 17|28 lbs. This enhancement coupled with the maintenance of the prohibition of the importation of the salt cis-Indus, permitted of the removal of the chain of preventive posts on the Indus, and with their abolition during 1897-98 the last relic of the great Customs Line disappeared. The enforcement of the prohibition of the importation of Kohat salt cis-Indus was effected by the District Police and Revenue Establishments until in May 1905 the prohibition was removed altogether, the equalisation in March 1905 of the duty on Kohat and Punjab salt having removed the necessity for any longer enforcing it. The enhancement of duty on Kohat salt from annas 8 to

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Rs. 2 a maund of 102 17|28 lbs. was followed by the transfer of the management of the mines from the Punjab Government to the Northern India Salt Revenue Department with effect from 1st January 1899.

(*b*) SITUATION.

The Kohat Quarries are situated in a belt of the low ranges of hills that run along the southern portion of the Kohat District, stretching from near Bannu to Duleepgarh eastwards to the Indus. In olden days about 14 quarries used to be worked. Out of these nine quarries Nundrukka, Munzullie, Burburra, Speena, Kurrur, Gooroozai, Soortung, Dhund and Shah were closed and by about 1869 only five Jatta, Nari, Malgin, Bahadurkhel and Karak remained working. Nari quarries were closed in 1898 and the circle was amalgamated with Karak in 1912. Malgin was closed in 1922. At present only Jatta, Bahadurkhel and Karak are being worked. Bahadurkhel is situated on the main road from Kohat to Bannu. Jatta and Karak are respectively 5 and 13 miles off the road. Quarrying, mining and sale proceed throughout the year.

(*c*) GEOLOGICAL.

Geologists consider the Range in which the Kohat salt mines are situated to be a trans-Indus extension of the Punjab Salt Range. There is a controversy about the age of the salt strata of the Salt Range. However, Geologists agree that the Kohat salt is undoubtedly of Tertiary age. The area occupied by the trans-Indus salt Range is about 1,000 square miles and it is estimated that about one-fifth of the entire area is taken up by salt which frequently occurs in marked exposures. Estimating the average thickness at 500′ or 1|10 mile, Ratton thinks that the total cubical contents of salt must be at least 20 cubic miles. In the anticlinal at Bahadurkhel where the salt is seen to be at the base of the Tertiary system, the beds can be traced for a distance of about 8 miles with an exposed thickness of over 1,000 feet. Rocksalt here forms bold cliffs rising to 200 feet on either side of the banks of a stream It averages a quarter of a mile in width. It has been laid bare by the denudation of an anti-cline. Mr. Wynne of the Geological Survey estimates its thickness to be 1,000 to 1,200 feet. The Jatta, Malgin, Nari and Karak salt beds comprise an area of at least four square miles of an unknown thickness, not less than 200 feet. Dr. Warth in 1873 estimated that the visible supply of Kohat salt was in all probability over 150 million tons.

In colour Kohat salt is of varying tints of grey with transparant blotches ; in some places it is darkish. The greyish tinge is due to slight bituminous admixture. Its texture varies from a crystalline mass to a somewhat earthy salt intermingled with finely divided grey clay ; this character, however, seldom prevails to the extent of interfering with the commercial value of salt, which is remarkably pure often containing about 99 per cent. of sodium chloride.

(*d*) SYSTEM OF MANUFACTURE.

(*i*) *Jatta.*

From the beginning up to 1926 salt was extracted at Jatta from quarries only. It was excavated with blasting powder and the usual iron jumper with chisel point, and was issued in irregular pieces just as at

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Khewra. In 1920-21 a proposal to convert the Kohat quarries into mines was considered on the spot by Mr. Glen George, but was dropped owing to objections raised by the workers and the facility with which salt could be extracted by surface operations. Quarrying went on till 1924-25. For some years the owners were unable to remove the overburden and so the quarries fell into difficulty. It was then decided to replace quarrying by mining. The local men being conservative were as usual against the proposal. However, Mining was started as an experiment in spite of their opposition in 1925-26 and about 400′—500′ of tunnel were driven. Gradually drifts, chambers, etc., were developed. Salt was for a time extracted by mining as well as quarrying. In 1931 bad ground was encountered and work on the exploratory tunnel had to be stopped. The mine has since been closed as the working became dangerous owing to the absence of hard marl as a cover to the salt and the divisions of salt seams by soft red clay instead of hard marl as is found in the Punjab salt mines. These clay seams become very soft during the monsoons. On small chambers being excavated the roofs began to crack and in a very short time enormous quantities of salt fell from the roofs. Mining operations have in consequence been entirely suspended. The mining operations cannot be started until ways and means to ensure the stability of the mine are found. Salt quarrying is going on. Great improvement in the working of the quarries has resulted through the insistence on a removal of the 'overburden' covering the salt beds.

(*ii*) *Bahadurkhel.*

At Bahadurkhel the salt bed is of very great thickness. Salt is obtained by quarrying at the centre of the anti-cline. Up to 1926 salt was obtained in slabs locally known as 'tabbis' about a foot square and some 4′ in thickness detatched from the sloping face by means of pick and wedge without the use of gun powder. Such regular slabs are suitable for transport by camels and donkeys. The 'kohatis' have great liking for them. The use of blasting powder was introduced in 1924-25. The quarry-men were conservative and opposed the introduction of powder in the beginning, but have now got used to it. All salt is now obtained by blasting. The system of working has now much improved, as a careful removal of the overburden covering the salt bed is insisted upon. The face of the quarry is kept at the correct slope and salt is worked in steps and so the danger from overhanging salt is avoided.

(*iii*) *Karak.*

Salt is obtained in slabs which are removed from the sloping face by means of pick and wedge without the use of powder.

(*e*) STORAGE.

Formerly the traders had to wait with their transport, as there were no stores. Now large covered stores exist at each source. In these days there is usually a reserve of some 80,000 to 90,000 maunds of salt in stock. This has facilitated issues to the traders who are no longer inconvenienced by having to wait as in former years. At Jatta there are 35 gangmen and they stack their salt in separate heaps. The salt is brought from the mine or quarries to the storeyard on donkeys by a contractor who is paid by the traders on the maundage transported. The rate of carriage varies from year to year ; it is about Rs. 2 per hundred maunds. At Bahadurkhel there is also a contractor, but he is paid by the quarrymen. At Karak there is no contractor, but quarrymen themselves bring salt in wheelbarrows to the depot.

(*f*) PRODUCTION.

The quarries came under the British sway in 1849 after the Sutlej campaigns. From 1849 to 1869 in 20 years an aggregate quantity of about 2,00,000 tons was extracted and issued on an average 10,000 tons or 3 lakhs of maunds per annum. The following table shows the production which from 1869-70 to 1885-86 has been shown in some typical years only. From 1885-86 to 1935-36 (last fifty-one years) output for each year has been given. Out of the five quarries that were working from 1869-70, Nari and Malgin were closed in 1898 and 1922 respectively. Since 1922 only three places Jatta, Bahadurkhel and Karak are being worked.

Year.	Production in lakhs of maunds.	Year.	Production in lakhs of maunds.
1869-70	4·96	1909-10	4·46
1870-71	4·07	1910-11	4·17
1875-76	4·17	1911-12	5·34
1880-81	6·10	1912-13	5·43
1885-86	5·24	1913-14	5·07
1886-87	5·65	1914-15	5·81
1887-88	5·69	1915-16	5·09
1888-89	6·49	1916-17	7·54
1889-90	6·97	1917-18	5·44
1890-91	5·68	1918-19	6·44
1891-92	7·51	1919-20	6·15
1892-93	6·23	1920-21	6·86
1893-94	5·90	1921-22	3·98
1894-95	5·91	1922-23	5·35
1895-96	7·85	1923-24	4·45
1896-97	4·96	1924-25	6·39
1897-98	3·22	1925-26	4·93
1898-99	4·62	1926-27	5·53
1899-1900	3·73	1927-28	4·98
1900-01	4·37	1928-29	6·00
1901-02	4·26	1929-30	5·82
1902-03	3·74	1930-31	5·95
1903-04	4·49	1931-32	5·48
1904-05	4·53	1932-33	5·17
1905-06	3·63	1933-34	5·62
1906-07	3·89	1934-35	5·30
1907-08	4·52	1935-36	5·47
1908-09	4·57		

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The details for the last three years are as follows :—

	Jatta.	Bahadur-khel.	Karak.	Total.
	Mds.	Mds.	Mds.	Mds.
1933-34	3.65,943	1,47,619	48,557	5,62,119
1934-35	3,28,875	1,55,935	45,240	5,30,050
1935-36	2,71,378	2,24,662	51,041	5,47,081

The output on an average has varied from five to six lakhs, Jatta producing about three and a half, Bahadurkhel a lakh or so, and Karak about half a lakh or so. Formerly there was no road to Jatta and salt was removed on pack animals. Whenever military expeditions were in progress owing to unrest on the frontier, pack animal carriage could be got with difficulty, which resulted in a decrease in demand and output. In 1890-91 production and issues fell off as compared to 1889-90, as carriage was required for the Khairabad Camp of Exercise and later on for the Miransai expedition. Sometimes Kabul traders could not come on account of snow-fall and so the issues and output fell off. Sometimes carriage was diverted to grain, and the salt trade became dull. The low output in 1897-98 was due to the enhancement of duty on Kohat salt in 1896. During the last 20 years the output has been more or less steady.

(*g*) Cost of production.

The traders pay the quarry-men directly for the salt purchased from their heaps in the store-yard, and make their own arrangements for transport, loading and weighment. The Government officers are, therefore, only concerned with the collection of duty. The rates paid for excavation and carriage at Jatta are Rs. 12-8-0 per 100 maunds, *i.e.*, 2 annas per maund for excavation *plus* Rs. 1-15-0 per 100 maunds for carriage to the depot and Rs. 1-2-0 for loading and weighment. The normal cost of carriage to Kohat is Re. 0-2-6 per maund or Rs. 15-10-0 per 100 maunds. The cost price of Jatta salt landed at Kohat, therefore, comes to about Rs. 31-3-0 per 100 maunds. At Bahadurkhel and Karak the quarry-men are paid Rs. 10 per 100 maunds which covers extraction, transport, weighing and loading. The carriage to Bannu and Peshawar, the nearest markets, has also been reduced as motor lorries are now largely in use for the transport of salt from the quarries to these and other stations and efforts are being made to induce the cartmen to use rubber tyred carts.

(*h*) Issues.

(*i*) *Old system.*

In olden days no stocks were maintained and the output depended on issues. Traders made their own arrangement with the miners to excavate salt ; the usual charge for excavation was about one anna a maund. At Jatta, Malgin and Nari salt was issued in irregular fragments ; at Bahadurkhel and Karak it was prepared for the trade in dressed rectangular blocks

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weighing from 20 seers to a maund each. Even now this system goes on at Karak. This is done to facilitate transport on pack animals over rough mountain roads. Formerly all salt was removed on pack animals, as there was hardly any wheeled traffic in the country on the border. Money was collected at the depot and remitted to treasury. In 1898 the Punjab Government permitted deposits of salt revenue into treasuries and the system of cash payment at the mines was abolished.

(ii) *Present System.*

When a trader wants to purchase Kohat salt, he first pays the duty into any authorised treasury or sub-treasury, receiving in return a treasury receipt with which he proceeds to the depot from where he wants to take salt. At the depot the receipt is compared with the advice list, the indent and the treasury receipt received direct from the treasury and if all the papers are found in order, an authority to issue salt is prepared. After allocation the salt is weighed and issued by the depot staff.

Jatta.—At Jatta weighments for carriage on pack animals and on wheeled conveyances are conducted separately. The quarrymen have their salt separately stacked in the store. The trader pays the quarryman from whose heap his salt has been weighed, also pays the carriage of salt contractor. The trader himself arranges for the labour for weighment and loading of salt. The rate of excavation paid by the trader to the quarrymen is 2 annas a maund. The cost of carriage to Kohat varies from time to time. It is roughly about Rs. 16 per hundred maunds.

Bahadurkhel and Karak.—The quarrymen are paid Rs. 10 per hundred maunds which covers extraction, transport, weighment, loading charges, etc. Most of the salt from Bahadurkhel goes by road to Bannu and from Karak it goes on pack animals.

In the past the output depended on issues and no stores were maintained, but now stores are kept and the issue figures differ from the output figures to some extent. The following table shows the issues of salt during the last ten years :—

Years.	Maunds.	Years.	Maunds.
1925-26	4,93,465	1931-32	5,66,400
1926-27	5,38,303	1932-33	5,33,462
1927-28	5,16,013		
1928-29	5,71,226	1933-34	5,61,119
1929-30	5,93,371	1934-35	5,33,050
1930-31	5,89,172	1935-36	5,49,681

Out of the total quantity of about 5½ lakhs of maunds about 4½ lakhs are generally removed on wheeled conveyance and about a lakh on pack animals.

(*i*) DISTRIBUTION.

Kohat salt is consumed in the North West Frontier districts, the tribal country adjoining them and Kabul. It is taken by rail, lorries and carts from Kohat to Peshawar and Hazara districts. Bahadurkhel salt mostly goes to Bannu from where it is taken to Dera Ismail Khan. By road it finds its way to Thal, Waziristan, Chitral, Baner, Swat, Bajaur, Tirah and Kabul. Traders from independent territory, Waziris, Turis of Kurram and Povindah, and traders from the Derajat and Marwatis take salt mostly from Bahadurkhel and Karak. Some salt also comes to the Mianwali district of the Punjab.

(*j*) PREVENTIVE MEASURE.

The Salt Revenue establishment posted to Kohat also see to preventive work ; besides officers, inspectors and jemadars there are armed havildars and peons who live at guard posts and see that salt is not removed. Any cases of damage to outcrops are reported and action is taken against the offenders. In 1930-31, 1931-32, 1932-33, 1933-34, 1934-35, and 1935-36 24, 82, 50, 36, 51 and 18 cases of damage to outcrops respectively were reported. These were exclusive of the cases in which seizures were effected. The abnormal increase of crime in 1931-32 was due to the Civil Disobedience Movement. In 1934-35 there were 22 seizures against 23 in 1933-34. The number of seizures during 1935-36 was 16.

(*k*) HISTORY OF ADMINISTRATION.

As mentioned in the first paragraph of this chapter, the quarries came under the British along with the Punjab mines about 1849. For about 20 years they were only nominally under Government, and they came under the jurisdiction of the Inland Customs Department in 1870. The Indus Valley Preventive line was established in 1851 under the Commissioner, Rawalpindi Division, while the Kohat mines were under the Deputy Commissioner, Kohat. It was thought advisable to have both the Indus Valley line and the mines under one and the same management. Proposals to this effect were formulated in 1884-85, but nothing came out. Under Secretary of State's orders sanction was accorded to post a Superintendent of the Northern India Salt Revenue Department in charge of the mines and the services of Mr. Johnson were lent to the Punjab Government in 1889. An Inspector was also appointed to do weighments in 1891-92. Duty on Kohat salt was raised to Rs. 2 in 1896. This was followed by transfer of the management of the mines from the Punjab Government to the Northern India Salt Revenue Department. From 1st January 1899 the Superintendent's post was raised to that of an Assistant Commissioner. Inspectors were stationed at Nari and Malgin. These two places were closed in 1912 and 1922 respectively. At present there are only three sources, Jatta, Bahadurkhel and Karak.

Up to 1st April 1935 the Kohat Division was known as the Kohat Mines Division. From 1st April 1935 the Division has been named the North West Preventive Division of the Northern India Salt Revenue Department. The Division is under an Assistant Commissioner (Pay Rs. 700—25—900—1,000 with a special pay of Rs. 100). Besides the work of the Kohat Division he is in charge of the Preventive work in the Salt Range Division and also supervises the operation of the rules for the refund of duty on salt used for industrial purpose. At present a supernumerary Assistant Commissioner is posted to the Salt Range Preventive Circle of the North West Preventive Division. This circle consists of the districts of Ferozepur, Amritsar, Lahore, Gurdaspur, Sialkot, Gujranwala, Sheikhpura, Gujrat, Jhang, Jhelum, Lyallpur, Shahpur, Montgomery, Mianwali, Dera Gazi Khan, Multan and Muzaffargarh in the Punjab. The districts of the North West Frontier Province and the districts of Attock and Rawalpindi are under the direct charge of the Assistant Commissioner, Kohat.

Superintendents (Pay Rs. 250—50|3—600) hold charge of Jatta and Bahadurkhel and a Deputy Superintendent (Rs. 200—10—300) of Karak. There is the usual subordinate staff consisting of inspectors, clerks, jemadars, havildars, peons, etc., Preventive work of Jatta, Bahadurkhel and Karak is attended to by officers incharge of circles and their establishments.

A consolidated ' Inam ' of Rs. 50,000 per annum is paid by Government to villagers and Malliks on account of their proprietary rights in the salt and for helping the Salt Department officers when out on tour and for rendering various other services to the Department. The ' Inam ' is distributed to about 42 villages and has replaced the ' Malikana ' that was paid in olden days at varying rates (4 to 25 per cent.) of the duty collected.

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CHAPTER VII.

Rajputana Salt Sources.

A.—SAMBHAR LAKE.

(*a*) HISTORICAL.

The term Rajputana signifies a great territorial circle which includes 19 Indian States, with the British district of Ajmere in the centre. The whole of Rajputana is saline in character. There are a number of depressions capable of producing salt. The most important of all these is the Sambhar Lake.

Tradition ascribes the formation of the Sambhar lake to the gift of Shakambari Devi, the tutelary goddess of the Chowhan Rajputs, who about 551-A.D. in return for milk supplied by one of their cows to a religious ascetic converted a forest into a vast plain of precious metals. The then inhabitants of Sambhar looking upon it as a curse rather than a blessing as it would be sure to lead to endless feuds, requested the goddess to retract her gift. But the goddess being too magnanimous to retract her favour, converted it into a crude form and transformed the lake from silver to salt.

Sambhar lake has been the scene of many fiercely contested battles between the Rajput Chiefs and their Mohammadan conquerors. The lake originally formed a portion of the territory of the Chowhans from whom after frequent contests, it was finally wrested by the Muhammadan invaders. It was not, however, till the time of Akbar that a settled system of working the lake was introduced. Akbar, to whose genius the value of the lake became apparent, improved its resources. In his days the income from the lake was about Rs. 2½ lakhs per annum. It had gradually risen to 15 lakhs, when Aurangzeb ascended the throne. The salt used to go far and wide. With the decline of the Moghul power, the revenues fell and ultimately about 1770 the two Rajput confederates appropriated the lake without a struggle.

During the next epoch, the management of the lake passed backwards and forwards between the Rajputs and the Mahrattas, Udaipur State too being mixed up in its affairs. History is silent as to what revenue was raised in those days (from 1770 to 1834) till the British assumed charge of the lake in 1835. This was through the difficulties of both Jaipur and Jodhpur resulting from the marauding of the Shekawattis, the bands of plunderers, which led the British Government to adopt vigorous measures for their suppression and stoppage of their predatory raids into British territory. A large British force was assembled at Ajmere for this purpose in 1834-35. The revenues of the Sambhar lake were consigned to the British Government by the States till the Government repaid themselves. The lake was released from sequestration in 1844. During these ten years it yielded a revenue of Rupees seven lakhs per annum. From 1844 onwards the lake was worked by Shamlat, the joint Government of Jaipur and Jodhpur.

Originally there were about 60 villages attached to the lake. The Muhammadan conquerors confined their attention to Sambhar. At that time Nawa and Gudha were insignificant hamlets but they gradually developed into salt marts. Most of the villages gradually fell off the lake, various States taking advantage of the weakness of their neighbours and apportioning the villages to themselves. The remaining ones were divided between the Jaipur and Jodhpur Darbars. Nawa and Gudha came to Jodhpur's share, and the lake remained the common property of both the States. When Jodhpur began to develop salt works at Nawa and Gudha, Jaipur became envious. This led to constant factions and discords between the two States ; the Holkar and the Scindhia too got mixed up with these. The revenues of Nawa and Gudha from 1860 onwards varied from 1¾ to 2 lakhs of rupees per annum. This went on till the lake including Nawa and Gudha was taken over by the British Government in 1870.

(*b*) OBJECT OF THE LEASE.

The British Government obtained the lease of Sambhar lake from the Jaipur and Jodhpur Durbars in 1870. The principal object which the Government had in view, in obtaining the lease was to increase the supply of salt and reduce its price in the United Provinces of Agra and Oudh by providing skilled supervision at the source and improving communication between it and the markets. Another object was the abolition of the Customs Line. Railway communication was extended to Sambhar and the assumption of the lake by the British had a most favourable effect on the price of salt in the British territory. In the beginning the selling price was 10 annas a maund, but it gradually fell to 3 to 4 annas a maund during the next 20 years. The arrangement was a source of profit to the Indian States, the British Government and the people. Government got the lease for an annual payment of Rs. 700,000 on the condition that if the sales of salt exceeded 17,25,000 maunds in any year, forty per cent. of the sale proceeds of such excess would be paid to the States as royalty. The royalty thus paid amounted, on the average of five years ending 1934-35, to Rs. 4,80,599-13-10.

(*c*) SAMBHAR LAKE-SITUATION.

Sambhar lake is the largest single salt source in India. It is situated in latitude 26° 58′ N and longitude 75° 5 ′ E on the east of the Aravalli range of hills in Rajputana. It is about 1200 feet above the sea level. The surrounding country is arid and sterile and to the north west is the Great Desert, with Sind on its western boundry. It is situated at a distance of about 50 miles from Ajmere. The western half of the lake lies within the Jodhpur State and the eastern half is owned by both Jaipur and Jodhpur jointly. Sambhar town is at its eastern end and Nawa town on its north-western shore.

The lake is about 22 miles long and about 6 miles broad, with an average depth of 2′. In the height of rains it covers an area of nearly 90 square miles. The circumference of the lake is about 60 miles. When the bed is dry, the area is about 50 square miles only. It is fed by four rivers which drain an area of over 2,200 square miles.

(*d*) GEOLOGICAL.

Various theories have been put forward to account for the saline character of the lake.

1. Some believe the foundation of the bed to rock salt.

2. The second theory is that the lake contains brine springs similar to those which exist in the Bharatpur State. In a report in 1902 Dr. Noetling suggested that the salt of the Sambhar lake is obtained from a subterranean saline spring arising along a fault-plane hidden by the mass of silt which now forms the bed of the lake. No proof exists as to the presence of a fault-plane, and no attempt has been made to account for the occurrence of salt in a spring arising through the Aravalli schists.

3. According to the third theory the lake is believed to derive its salinity from the denudation of the rocks of the surrounding country which is supposed to belong to the Permean system—a system which abounds in lime stone or salt. The Sambhar lake is annually replenished by rain and the drainage of the surrounding country. The lands from which this drainage flows are more or less impregnated with salt given off in a sort of efflorescence which is swept into the lake by the rivers. But this cannot explain the tremendous amount of salt taken out for centuries. The wells around the lake contain sweet and fresh water. So some geologists suppose that the origin of salt cannot lie on the surface of the soil, but in some central sphere below the low water mark of the lake in the shape of a foundation of rock salt or in brine springs. Some suppose that a stratum of salt brine of high density underlies the bed of the lake at a depth of about 30′ and is under great pressure. Generally the major portion of the brine in the lake is pumped out into reservoirs and crystallisers and the remnant evaporates leaving the bed exposed to solar heat in a dry atmosphere. But though this happens, the mud of the lake bed remains soft and wet. This is probably owing to the evaporation of subterranean brine and salt in that brine in such cases drains upwards by capillary attraction and remains in the soft mud on the surface of the lake bed. When the lake again fills, the water which collects in it is agitated by the prevailing strong winds, most of the salt in the surface mud is taken up in solution and the visible supply of salt is thus renewed. Experience shows that the brine is richer in salt in years during which high winds blow than those during which the atmosphere is calm.

4. According to Sir Thomas Holland the salt resources of Sambhar appear to be limited to the body of silt filling in the depression in the Aravalli schists where the sodium chloride along with large quantities of sodium sulphate and sodium carbonate has accumulated in a way common to arid regions of internal drainage. He also believes that the supply of subterranean brine is dependent on the access of water from the sweet water zone all around the lake. Inward percolation of water from the margin is essential to the formation of large quantities of subterranean brine. He remarks : " The Sambhar Lake is a silt filled depression in the Aravalli schists and gneisses in which a body of mud and sand with kunkar and gypsum (some 75 feet thick in what appears to be about the centre of the depression) includes from 2 to 12 per cent. of sodic chloride, with smaller quantities of sodic sulphate, sodic carbonate and potassic sulphate. Every year the water brought in by the rivers. which are in flood during the monsoons, forms a lake some 60 square miles in area and 2 to 3 feet deep. The water which is fresh where it first comes in, takes up salt from the accumulated stocks in the silt and forms a strong brine which is partly led into prepared enclosures (kyars) for the separation of salt by solar evaporation, partly isolated by temporary reservoirs constructed and cut off bodies of the lake water in

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anticipation of the recession towards the centre during evaporation and partly forms a thin crust of white glistening salt on the bed of the lake where it is allowed to remain up till the arrival of the next monsoon and the usual annual flooding of the lake ".

5. Sir Thomas Holland and Dr. Christie have shown that the salt is brought as a fine dust by the southwest monsoon from the Runn of Cutch and from the sea coasts and is dropped in the interior of Rajputana when the velocity of the winds passing over it has decreased.

The lake bed is composed of 1½′ of black fetid mud. Below the mud is a layer of quicksand overlying a stratum of micaceous schist decomposed on the top, but harder below. No rocks are found to a depth of 20 feet. Borings were made in 1904-05, they touched the underlying Arvalli schists at a depth of about 70 feet. Salt pervades in minute crystals the whole substance of the black mud which contains an immense quantity of it. According to Sir Thomas Holland and Dr. Christie there are fifty-five million tons of salt in the first 12 feet of this saliferous silt alone. The large harvests removed annually under the British management of the lake have caused no appreciable diminution in the stock which according to Sir Thomas Holland may be considered sufficient to meet all demands for a practically unlimited period. Stretching over the whole area and to a depth of 60-70 feet lies the body of this silt in which the salt resources of Sambhar are hidden.

(*e*) SYSTEM OF MANUFACTURE.

(i) *Pre-British.*

In olden days large enclosures were made 3 or 4 hundred yards square and staked off with large thick piles driven together in two rows. A layer of grass was placed next to and inside the stakes and filled up with mud well rammed to prevent penetration by the water from the lake as also to keep off the action of the wind. The inside space was divided into beds, about 6 in. depth of brine was kept and allowed to evaporate in a few days. The salt then settled down and was removed. Some time salt was made to deposit on bushes, etc., in fine crystals. Sometimes low retaining walls were constructed to prevent water from receding to lower levels. When the British Government took over in 1870, the retaining walls were 7,700 yards long and the area worked was 411 acres.

(ii) *From 1870 to 1920.*

The lease of the lake was taken by the British Government in 1870. The following systems of manufacture were then followed :—

Lake salt (spontaneous).—This salt formed spontaneously in the bed of the lake as the brine evaporated without any assistance, except that light screens or retaining walls called ' pais ' were run out to retain the brine in selected areas most favourable for condensation and extraction of the salt. If this were not done, the brine would recede to the centre of the lake and the salt would be deposited at such a distance from the shore that storage would become difficult and expensive. When the brine of the lake reached a high specific gravity and began to recede towards the centre, it was enclosed within sections of the lake bed by means of

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rough retaining walls 1½ feet to 2 feet in height, built of double lines of stakes lined with grass. The space between the stakes was filled with lake mud. These enclosed sections were generally situated near the shore, since salt formed in them had to be carried to the shore by the labourers and a long distance from the storage site would make the carriage too expensive. The brine was maintained at 25° B and about 12″ deep. Fresh supplies of brine too were admitted. When ready, the salt crust 2″ to 3″ was taken out and heaped up by labourers in the enclosures and basket-fulls of salt were brought out and stored in large heaps on the lake edge. This spontaneous salt was of average quality. From 1870 to 1890 a fair amount (on an average about a million maunds) was produced under this system. In a favourable year the area under this system was 5 or 6 square miles. When the level of the lake was low owing to a low rain-fall, the quantities of brine enclosed in the lake bed enclosures were small and yielded a small produce of salt. In 1894-95 about 6½ lakhs of maunds were produced under this system. This method finally disappeared in 1899.

Pan Salt.—After the close of the rainy season, shallow evaporation pans each about 100 feet long and 50 feet broad were made along the line of the lake shore by scraping aside the soft surface mud and with it enclosing rectangles with ridges of about a foot in height. The pans were fed from large trenches cut down towards the deepest part of the lake and also from brine retained in deep reservoirs which were filled when the lake was full. The brine from trenches and reservoirs was raised by " Jhapulas " baskets lined with sheep skin each worked by two men. In a year of good rain-fall brine was mostly utilized from the lake, but in a year of drought the pans were mostly fed from wells. The brine in the pans was kept at a depth of three or four inches. Crops were obtained in rapid succession, each crop being ready within a period ranging from 2 to 4 weeks according to weather. When salt precipitated, it was scraped up by means of small pieces of planks, attached to long handles. It was first placed in conical heaps near the pans and finally carried to storage ground and stored there in big heaps. In olden days a large quantity, often 30 to 40 lakhs of maunds, was manufactured under this system, about 4,000 to 5,000 of these pans occupying a length of 15-20 miles along the lake shore being worked. About 1880 the number of pans worked was 2,000 ; during 1882 it was 4,394. At Sambhar no pan salt was produced after 1911-12 and at Nawa after 1919. In 1919-20 only 358 pans were worked at Gudha. The construction of Gudha kyar about 1919 finished the pan works there. Salt produced under the pan work system was fine-grained and free from algae. Gradually, however, it gave way to kyar salt which has large crystals.

Kyar Salt.—A kyar is a salt work constructed in the bed of the lake by enclosing a rectangular space with an embankment of lake mud 5 to 6 feet in height, pitched with stone to protect it from the main body of lake water. Within the enclosure large solar evaporation pans are excavated and brine is run into these pans from the lake by gravitation or by pumping. When the salt crust is ready, it is broken up and is extracted after being washed in bitterns, and stored in oblong heaps. In 1880 out of a total output of 60 lakhs, 25 lakhs was pan salt, 11 lakhs spontaneous lake bed salt and 24 lakhs kyar salt. In 1886, out of a total of 67 lakhs, 34 lakhs was pan salt, 21 lakhs spontaneous lake bed salt and 11 lakhs kyar

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salt. In 1894-95 out of a total of 70 lakhs, 22 lakhs was pan salt, 6 lakhs Lake bed salt and 42 lakhs kyar salt. This shows that the kyar method gradually ousted the other two systems.

In 1898 there were 10 kyars at Sambhar and one at Nawa. The size of these rectangles varied from 1861 ft. × 951 ft. to 4150 ft. × 1446 ft. The smallest enclosure had 14 solar evaporation pans each 420 ft. × 152 ft. and an evaporating surface of 28½ acres, the largest had 60 pans each 670 ft. × 200 ft., and an evaporating surface of 184½ acres. The total evaporating surface was about 736 acres. After 1900 most of the product was kyar salt. For getting subterranean brine a canal was constructed at Sambhar in 1906. This proved a valuable asset in manufacture. Pumping machinery too was introduced, and reservoirs constructed, but the output could not be guaranteed.

(iii) *Improvement scheme 1920-24.*

Sambhar, the largest single source of salt supply in India, was a cause of grave anxiety up to 1920. In favourable years the output went up to 100 lakhs, but in an unfavourable season it fell even to 5—10 lakhs. Sometimes shallow brine in a year of scanty rainfall dried up before being used for manufacture. From time to time efforts were made to stabilize the output by the construction of reservoirs and canals, but failure of supply could not be stopped. The great war and the failure of supply in 1917 owing to floods attracted attention to the necessity of developing the resources of the lake. The services of Mr. S. A. Bunting, Irrigation Engineer, were secured ; he put forward the Improvement Scheme. The object of the scheme was the stabilisation of this precarious source of salt supply by conserving low density brine, constructing new kyars, condensors and canals, overhauling the old pumping arrangements and putting the systems of manufacture on a sound footing. One of the important features of the scheme was improvement of the arrangements for transport, storage and issues.

Across the lake a 2¼ miles dam (known as the Gudha-Jhapog Dam) was constructed. This converted the Sambhar end of the lake into a big reservoir (Main Reservoir) 5-6 square miles in extent. A percolation canal was also constructed at Gudha. Pumping arrangements prior to the scheme were unsatisfactory. A new power-house was built. Two 100 K. W Semi-Deisel generating sets, the first Vickers Petter-Metropolitan Vickers and the second Vickers Petter-General Electric Company were installed. (They have been recently replaced by Diesel engines.) A third 40 K. W. set was installed for light loads. Old pumps were replaced except in two kyars by new ones worked by electric motors.

Another feature of the scheme was the construction of a New Kyar 4,000′ × 2,000′ west of the Sambhar railway station, having a reservoir attached to it and laid out on scientific principles. The accretion system of manufacture was thus placed on a sound footing. Transport and storage schemes were undertaken which will be dealt with in the following pages. The scheme achieved its object. It has removed the possibility of a failure of the supplies, resulting from a bad monsoon, since even with a poor rainfall a fairly large quantity of salt can now be manufactured.

(iv) *Present system.*

As has been seen, the bed of the lake is composed of a fine black tenacious mud very soft to a depth of about 2 feet from the surface, but gradually hardening at lower levels. The lake has no outlet, the supply of water is derived from the rivers Mendha, Rupnagar, Kharian and Khandel that fall into it. During hot and cold season they run dry, but during rains they come in floods and fill the lake 3 to 4 feet deep. Rainfall varies greatly and during the last 75 years it has fluctuated between 10 and 40 inches, the average being about 20 inches. Sambhar lake is thus dependent for its supply of water on rainfall and on water brought in by these four feeder streams. Temperature, wind velocity and soil are fairly well suited for manufacture. During the months when the lake is dry, March to July, salt deposits in the form of an efflorescence on the surface of the bed of the lake. This is due to the effect of capillary attraction on the reserves of salt in the mud below. This salt efflorescence is renewed annually by a provision of nature and forms the nucleus of the salt supply of the works. In the early stages the water in the lake is to all intents and purposes fresh water registering 0°, but gradually the salt efflorescence is dissolved as the water in the lake is agitated and stirred up by the constant west wind that prevails, and in time it acquires the salinity of sea water 3° ; the loss in volume by evaporation that occurs in this process varying from 30 to 60 per cent. of the water originally present in the lake. The specific gravity of this is 1.03, and it rises, as the dry hot weather advances, to 1.24 (29° B).

The Gudha-Jhapog dam encloses an area of 5 square miles at the south east end of the lake which forms a reservoir for the collection of the brine supply from the Main Lake. After the close of the monsoon, as soon as the brine in the lake has risen to a density of 3° to 5° B, it is transferred to the Main Reservoir by gravity through sluices and by means of three pumps, two at Jhapog and one at Gudha. When the density rises to 15° or 16°, it is pumped into the reservoirs and condensers attached to the kyars. The crystallising beds receive their first supply of brine, much as the lake proper, from rain water which dissolves the wind salt rejected as unsaleable from the produce of each pan extracted during the season. The pans are then replenished by drawing brine from the reservoirs, the idea being to obtain a depth of 12″ to 16″ by the time the density rises to 25° or 26° B, about October or November. The saturation point for the lake brine is 26° B. Salt is then allowed to precipitate in the crystallizing beds, which are repeatedly irrigated by fresh admissions of brine of a density as near saturation point as circumstances will permit, so as to prevent the density rising beyond 29° B. As the season advances, the effect of impurities in the brine and of the increased rate of evaporation becomes more and more marked. Owing to rapid evaporation crystals tend to become smaller in size.

The best quality salt is formed during the winter months November to February. Replenishments are continued till March or April in oder to obtain a thick crust. Brine for replenishment is also taken from canals. Extraction of salt is commenced, when the mother liquor reaches 30° B. and crust is about 4″ to 6″ thick. In replenishing pans good care is taken to see that brine used is free from organic impurities such as ‘ Neel ’ or algæ. Only one crop is taken annually.

The period over which the manufacture of salt extends is determined by the reserve of brine in the storage reservoirs and varies from 8 to 9 months. The beds vary in size and consist of black tenacious clay which is well suited for the purpose of manufacture. Sometimes the beds are sandy. The work of preparing the beds consists in flushing them to remove all impurities, levelling them by means of a weighted board termed ' pata ', and spreading on their surface the wind salt formed during the season and rejected as unsaleable.

The works consist of groups of crystallising beds and accompanying storage reservoirs (the groups being termed ' kyars ' or enclosures), and are divided into :—

(1) The Main Line Kyars which run parallel to the B. B. and C. I. Metre-gauge track which connects Sambhar with Gudha. It consists of 99 pans of which 40 have been converted into a series of condensers. The crystallising beds have an area of 134 acres.

(2) The Deodani Kyars with 68 pans and a crystallising area of 332 acres. These are the main works and furnish 40 per cent. of the salt output of the lake. They lie to the north-east of the town and extend to a distance of almost 2 miles.

(3) The Jhapog Kyar some 5 miles from Sambhar on the south-west shore of the lake with 24 pans and a crystallising area of 666 acres.

(4) The Gudha Kyar some 5 miles north-west of Sambhar on the north shore of the lake with 12 pans and a crystallising area of 72 acres.

(5) The New Kyar situated about half a mile west of Sambhar station completed in 1924 with 13 pans and a crystallising area of 189 acres.

(6) Nawa Kyar at the north-west end of the lake opposite Kuchaman Road railway station, some 15 miles from Sambhar, with a crystallising area of 178 acres. At these works the recurring difficulty of brine shortage was met by the construction in 1870 of a coffer dam of mud enclosed between grass and stakes to hold up the brine in the north west area of the lake and prevent it being headed up to Sambhar by a strong west wind leaving Nawa high and dry. This coffer dam ran from Hirakund to the south shore of the lake and fulfilled on a smaller scale the same function for the Nawa works as the larger Gudha-Jhapog dam now does for Sambhar, Gudha and Jhapog. It has been kept in repair and occasionally renewed when swept away by floods as occurred in 1882, 1917 and 1924. Canals have also been dug encircling part of the Deodani set of works, also at Gudha and Nawa. They furnish subterranean brine of a density carying from 14° to 20°, but as the quantity is very limited their utility is most noticeable when the season has advanced and manufacture is protracted, when they serve to control the densities of pans. Densities are kept below 30° to prevent other salt such as sodium carbonate or sodium sulphate from precipitating.

(*f*) STORAGE.

In olden days the system of storage was crude. Salt was stored by the labourers near the pans wherever they liked. Then the system of stacking in heaps was introduced. Under it salt was heaped beside the pans themselves and these being scattered along the lake side, the Railway had to deliver wagons and groups of coolies had to go for loading daily to dozens of different points—miles apart and miles from Sambhar, the wagons to be laboriously collected again for marshalling into rakes—all at enormous waste of time and energy. The small heaps were measured and paid for. An improvement was made during 1918-19. The old system in vogue at the lake of dumping the extracted salt for the purpose of measurement and the payment of labour in innumerable small heaps which had in the evening to be regathered and carried off to the storage heap was abolished. A contract system was introduced and the contractor paid all labourers himself, the Department paying him on the estimated contents of the storage heaps. An immense saving of time and energy was secured under the contract system.

Under the Improvement Scheme further improvements were effected. The Deodani and Jhapog transport and storage scheme, the Gudha Transport and Storage scheme and the construction of a Central Store at Sambhar were the main features of the scheme relating to Transport and Storage. Hills had to be cut, realignment of all pan charging and discharging channels, innumerable culverts and sluiceways, bridges, etc., had to be done. The Central Store was dug out of the hill side. It consists of two high level sidings north and south, on earth embankments faced on the inside with masonry, and one centre high level siding laid on salt. The two side platforms are 80 feet wide, while the centre platform is 180 feet wide. The average length of the sidings and platform is 1,500 feet and height of the salt heaped on them usually 21 feet. The storage is thus 88 lakhs of cubic feet of salt. There are three more storage platforms Nos. 5, 6 and 7. In the Jhapog and Deodani kyars a metre-gauge track serves the crystallizing pans so that metre-gauge wagons can be run along the pans. The Main Line and New Kyars are served by 2 feet gauge line carrying tipping trucks. The tubs are brought by locomotives on to the central store and salt unloaded there. The work of extraction from the pans, loading into tubs, transport to and unloading into the central store is done by a single contractor. An account is kept of the salt received at the central store by Receiving Officers and the contractors paid accordingly. For several years past the contract has been held by the Rajputana Salt Sources Co-operative Labour and Savings Society Limited—a society of labourers and employees under the management of an officer lent by the Department.

Gudha has a similar store, with two permanent main lines, along the edges of the pans, turnouts for each pan for connecting temporary lines during extraction, a collecting line connected to both main lines in the centre of the system and a ramp 1,200 feet long leading to a ferroconcrete triple T beam viaduct 814 feet long and 16 feet high from which salt is dumped. The platform is 814 feet long and 175 feet wide.

At Nawa which was left outside the development schemes, the salt is taken out from the pans and stored in big heaps by their side. The contractor is paid on the estimated contents of the heaps.

Since the Improvement Scheme days, better arrangements for transport, storage and issues have effected saving in time, labour and money and have made for increased efficiency and removed the serious trouble of manufacture, transport and issues.

In Rajputana salt is not stored under cover nor in any way protected from the weather, for in the climate of Rajputana the loss from exposure is slight and the expense of protecting the salt in any way would be far in excess of the advantage it might afford.

(*g*) QUALITY OF SALT.

Salt forms in large crystals in the shape of truncated pyramids. In colour the crystals are white grey (owing to the presence of finely divided clay in the fissures of the crystals) and have shades of pink (due, it is believed, to infusoria). The crystals vary from half to an inch or more across the base, their size and solidity varying according to the quality of the brine and conditions of the season. Sometimes the salt is a bit discoloured owing to the fact that in a large number of the condensers and crystallizing pans algæ are present. Generally the salt is hard and firm, difficult to break down, between the finger and thumb. When badly made it is hollow, light and friable. When salt is collected, care is taken to see that it is not soiled with mud and that it is properly washed in the bitterns and is freed from impurities which can be removed by washing with bitterns and by picking. Sambhar salt contains 98 to 99 per cent. of sodium chloride, 0.5 to 0.2 per cent. of sodium sulphate and .02 to .1 per cent. of sodium carbonate, and 1.3 to 0.7 per cent of insoluble residue and moisture.

(*h*) PRODUCTION.

The largest output prior to the British occupation of the lake was about 20 lakhs of maunds in 1839. The average about the time of British occupation (1870) was 9 lakhs. The table below gives the figures, in lakhs of maunds, of output from the lake since 1870-71 :—

Year.	Production in lakhs of maunds.	Year.	Production in lakhs of maunds.
1870-71	11·42	1884-85	3·76
1871-72	14·26	1885-86	17·61
1872-73	15·85	1886-87	67·35
1873-74	16·28	1887-88	34·97
1874-75	25·01	1888-89	60·48
1875-76	16·58	1889-90	20·42
1876-77	1·57	1890-01	58·93
1877-78	59·28	1891-92	34·42
1878-79	39·99	1892-93	0·91
1879-80	5·00	1893-94	44·51
1880-81	29·94	1894-95	70·35
1881-82	32·90	1895-96	51·29
1882-83	45·84	1896-97	30·10
1883-84	71·11	1897-98	18·31

Year.	Production in lakhs of maunds.	Year.	Production in lakhs of maunds.
1898-99	53·18	1917-18	45·35
1899-1900	16·38	1918-19	111·91
1900-01	13·79	1919-20	44·77
1901-02	61·76	1920-21	64·35
1902-03	47·44	1921-22	50·18
1903-04	5·72	1922-23	57·17
1904-05	43·49	1923-24	87·02
1905-06	49·94	1924-25	53·02
1906-07	49·64	1925-26	88·66
1907-08	31·50	1926-27	44·73
1908-09	62·80	1927-28	66·78
1909-10	67·71	1928-29	67·31
1910-11	100·05	1929-30	57·09
1911-12	12·30	1930-31	74·30
1912-13	21·86	1931-32	71·13
1913-14	77·16	1932-33	68·36
1914-15	39·96	1933-34	71·73
1915-16	71·53	1934-35	68·16*
1916-17	20·28	1935-36	76·23*

* These figures include reshta salt.

There are large variations in output which are almost entirely due to excessive or deficient rainfall, though at times labour difficulties too have played their part. The lowest production on record, *viz.*, in 1892-93 (91,000 maunds) was the result of continuous floods. The low outturns in 1900-01 and 1911-12 were due to failure of the monsoon and those in 1912-13 and 1916-17 to its severity. The maximum output in 1918-19 would have been larger but for the influenza epidemic of that year. The amazing variations that earlier figures disclose are wholly a thing of the past now as the Lake's old dependence on rainfall has been reduced to a minimum by the Improvement Scheme. The figures given above are for official years. It is interesting to compare them with the figures for seasons which may run from October till June. Season figures—showing the quantities produced in the various circles are given below :—

Season.	Sambhar including Jhapog.	Gudha.	Nawa.	Total.
1900-01	20·07	2·74	20·51	43·32
1901-02	15·08	3·64	13·63	32·35
1902-03	28·89	2·75	15·59	47·23
1903-04	17·53	2·50	12·49	32·52

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Season.	Sambhar including Jhapog.	Gudha.	Nawa.	Total.
1904-05	8·77	2·81	19·24	30·82
1905-06	21·32	5·54	20·11	46·97
1906-07	27·86	4·84	23·62	56·32
1907-08	30·22	5·45	18·51	54·18
1908-09	42·34	3·74	15·49	61·57
1909-10	56·99	4·52	18·58	80·09
1910-11	37·84	2·13	8·46	48·43
1911-12	8·47	2·05	7·12	17·64
1912-13	32·58	3·24	11·21	47·03
1913-14	45·03	4·78	19·49	69·30
1914-15	35·08	2·84	11·33	49·25
1915-16	29·22	3·67	13·41	46·30
1916-17	35·78	2·23	10·98	48·99
1917-18	58·64	3·51	15·82	77·97
1918-19	54·28	3·40	16·93	74·61
1919-20	32·26	5·89	7·77	45·92
1920-21	32·98	7·59	8·07	48·64
1921-22	39·95	12·55	17·49	69·99
1922-23	50·53	9·40	20·18	80·11
1923-24	54·69	7·20	17·79	76·68
1924-25	42·33	4·14	5·45	51·92
1925-26	64·64	8·35	8·17	81·16
1926-27	53·12	6·81	7·15	67·08
1927-28	48·73	6·39	..	55·12
1928-29	50·56	6·93	11·79	69·28
1929-30	43·68	3·73	2·21	49·62
1930-31	68·96	9·91	12·84	91·71
1931-32	48·85	8·64	9·01	66·50
1932-33	55·29	8·42	7·97	71·68
1933-34	55·08	7·93	8·27	71·28

(*i*) COST OF PRODUCTION.

In olden days pan salt was produced at about 6 pies per maund and kyar salt at 8 to 10 pies per maund. The extraction and storage of salt is now performed by a contractor selected by public tender and paid per 1,000 feet. The present rates are from Rs. 12-8-0 to Rs. 15 per 1,000 cubic feet. The quantity delivered into store by him is converted into maunds on the assumption that one cubic foot weighs 32 seers. The average cost of production in the year 1928-29 and 1929-30 worked out to 0-4-11.96 and 0-5-6.86 per maund respectively. The high cost in the latter year was due to the fact that 10,22,337 maunds of salt were washed away at Nawa by the heavy floods in the lake and also to the expenditure on repairs and protective works necessitated by the floods. The cost of production based on both direct and indirect charges these days works out to about 4 annas a maund. In 1935-36 it worked out to Re. 0-3-6.38 per maund.

(*j*) SYSTEM OF SALES.

(*i*) *Old system.*

Prior to the connection of Sambhar with rail all salt was sold to purchasers at the lake. With the railway connection in 1876 salt began to be sent by railway. The Through Traffic system was devised to facilitate the supply of salt to the outside public. A system of sale at Government depots or through the agency of contractors existed for sometime, but it was abolished. After the War demand for salt increased enormously. Traders, speculators and others flooded the market with indents. Profiteering traders sold salt at high rates and the public suffered. So the Agency system was introduced in 1920-21. In consultation with District Officers reliable agents were appointed in each district and were permitted to indent for salt on the condition that they would sell wholesale at a fixed price. This system was abolished in 1924 and replaced by open indenting. A trader had to submit an application at authorised treasuries, sub-treasuries or post offices which were notified by the Commissioner. With his application the trader had to desposit the duty on and the price of salt applied for at the rates respectively fixed and in force on the day when payment was made, together with all charges in connection with bagging, weighment, loading and despatching of the salt. Traders were required to supply their own bags. The officers in charge of the treasury, sub-treasury or post office in which the revenue was deposited sent the indents direct to the General Manager. If the indent was in order, an authority for issue of salt was prepared and forwarded to the Superintendent in charge of the store. This system continued till 1928-29 when one or two big firms assisted by the credit system put in heavy indents and tried to monopolize the trade. So the system of allotment of wagons on a *pro-rata* basis was devised. Under this system the quantity of salt to be cleared during any month was notified in advance and traders had to put in their indents by a certain date. No single firm or trader could indent for more than one fourth of the total salt to be cleared during the month Indenters for 10 wagons or less were classed as small and those for wagons in excess of 10 as large indentors. The number of wagons to be cleared was divided into large and small indentors in the proportion of total indents of each kind. Large indentors were allotted wagons on a sale calculated on the ratio of the number of wagons indented for to the number of wagons

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available for allotment to the large indentors. A maximum allotment of 5 wagons to each small indentor was made according to an alphabetical list of the indentors' names till such time as the number of wagons available for the small indentors was completed. The unallotted indents could be refunded or taken in the next allocation. This system was abolished from May 1933.

(*ii*) *Present system.*

Free indenting rules were again introduced from 1st May 1933. Under the existing procedure all the indents are accepted daily by the General Manager at his office upto 1 P.M. on each working day for weekly clearance, provided that the total number of indents received does not raise the daily total of clearance above 125 wagons or such higher number of wagons as the Commissioner may in special circumstances determine.

All indents so received are arranged in alphabetical order in one group according to the letter of the day drawn weekly and no allotment to any person in each round of the alphabet exceeds 30 wagons and if after a round of the alphabet has been completed, any indent remains to be allotted the procedure followed in the first round is repeated and continued till all the indents received have been exhausted. Should the number of indents received in any week exceed the limit specified above, the balance is returned to the indentors. The revenue deposited in respect of indents so returned is refunded or kept in deposit against further indents at the option of the indentors.

In addition to the indents so received, the Commissioner may at any time authorise the General Manager to accept short-notice indents, provided (*a*) that no such indents will be accepted in excess of a figure which, when added to the regular indents in hand, will raise the daily clearance above 125 wagons, and (*b*) that deliveries against regular indents shall, if bags are duly supplied, have priority over deliveries against short-notice indents.

Farodis.—In addition to the ordinary indent system, salt may be obtained for retail sale within a protected area by persons known as 'Farodis'. The rules for farodis are the same as in the Salt Range Division, farodis being required to get the usual licence and to keep regular accounts of the sale of salt.

(*k*) SELLING PRICE.

When the British Government took over the lease, the selling price of salt was 10 annas a maund. For some years heavy treaty charges were included in the selling price and the selling price varied from 5 to 10 annas a maund. From 1889-90 the Government of India agreed to only a portion of these charges being debited to the sale price of salt ; so the price was gradually lowered till on the 1st January 1891 it was fixed at 2¾ annas a maund. In 1894 it was fixed at 4 annas a maund. It was raised to Re. 0-4-3 from the 7th June 1927, to Re. 0-5-0 from the 15th July 1929 with an additional despatch charge of six pies per maund. From 1st October 1935 the despatch charges were reduced to three pies per maund. The selling price was reduced to Re. 0-4-3 per maund from 1st April 1936.

The fixed compensation payable annually to the States amounts to about Rs. 28 lakhs. Under the present system of allocation the amount of fixed compensation debited to Manufacture is Rs. 3 lakhs only, this sum is distributed between Sambhar, Didwana and Pachbadra in proportion to the sales at each source. In addition, Government debits to the cost of manufacture at Sambhar a Royalty which it pays to the Jodhpur and Jaipur Darbars of two-fifths of the selling price of all salt issued from Sambhar in excess of 17.25 lakhs of maunds per annum. The accounts of any one year are debited with the payments on issues in the previous year.

Bags are supplied by the traders or their local agents.

(*l*) ISSUES AND DISTRIBUTION.

Salt is issued in 2-1|2 maund bags. Up to 1933 a wagon load was of 267 maunds and 20 seers ; but since 1933 a revised wagon load unit of 295 maunds was introduced. The number of bags that go to make up a wagon is 118. Wagons are shunted into the Central store sidings at Sambhar and Gudha and to the kyar sidings at Nawa. Preliminary weighments are conducted by kotgashts. The weighment Officers test-weigh one fourth of the bags and clear the consignments. Salt to farodis is issued under practically the same rules as at Khewra.

In olden days Sambhar salt was first taken to Bhiwani and from there to Delhi. From Delhi it went by rail to Oudh, North-West and Central Provinces, Agra, Tonk, Boondi and Rewari. The salt removed by road was carried entirely by Banjaras who visited the lake with their pack bullocks and conveyed the salt to parts of Rajputana south of Sambhar. When the Rajputana State railway was extended to the lake in 1875-76 ; most of the road traffic was diverted to railway.

About 1880 depots were established at Nasirabad, Agra, Delhi and Neemuch, but they were closed within three or four years, as they did not appear to be necessary. The Through Traffic system and provision for the deposit of revenue in Post offices afforded facilities and stimulated railborne trade which developed greatly. Salt began to be carried over the B., B. & C. I. Railway and Bengal Nagpur Railway. The Banjara or road traffic gradually fell off, though it still goes on to some extent.

Nawa salt used to go *via* Kishengarh to Boondee, Kotah, Bhiwani, Hissar, Chambal, Jhansi and Saugar. It took a circuitous route *via* Kishengarh to avoid transit duties levied by the Jaipur Durbar.

Now-a-days the Sambhar Lake salt is consumed in Rajputana, in the United Provinces, parts of the Central Provinces, Central India and Delhi.

The issues of Sambhar salt since 1906-07 and its distribution are shown in the following statement :—

(In lakhs of maunds).

Year.	Punjab.	U. P.	Bihar and Orissa.	C. P.	Raj-putana.	C. I.	Bengal.	Bombay	Total.
1906-07 ..	2·78	32·11	·08	·72	6·28	4·11	..	..	46·08
1907-08 ..	3·23	35·69	·20	·89	7·66	4·92	..	..	52·59

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Year.		Punjab.	U. P.	Bihar and Orissa.	C. P.	Raj-putana.	C. I.	Bengal.	Bombay.	Total.
1908-09	..	2·75	32·55	·22	1·25	6·88	4·75	..	..	48·40
1909-10	..	2·35	33·34	·32	1·23	8·12	5·40	..	..	50·76
1910-11	..	2·28	28·45	·38	1·55	7·17	7·23	..	..	47·06
1911-12	..	2·39	33·10	·32	·87	7·59	4·27	..	..	48·54
1912-13	..	2·13	32·88	·34	1·01	7·77	5·76	..	..	49·89
1913-14	..	2·18	31·89	·57	1·05	8·09	5·66	..	..	49·44
1914-15	..	2·51	36·10	·74	·91	8·15	5·86	0·1	..	54·28
1915-16	..	1·97	30·50	3·63	·76	7·36	4·67	..	..	48·89
1916-17	..	3·13	42·27	10·81	2·52	9·36	5·29	·30	..	73·68
1917-18	..	1·78	28·66	10·32	1·10	6·98	4·35	1·38	·01	54·58
1918-19	..	2·62	45·40	11·33	·96	9·76	4·57	·13	·09	74·86
1919-20	..	2·63	41·11	5·17	·73	7·29	3·96	·02	·01	60·92
1920-21	..	1·53	31·37	2·53	1·28	6·93	3·45	·01	..	47·10
1921-22	..	2·68	45·80	1·35	1·17	6·66	4·36	..	..	63·02
1922-23	..	2·29	50·62	1·84	1·41	7·50	4·70	..	..	68·36
1923-24	..	1·76	32·80	·79	·96	4·27	2·39	..	..	42·97
1924-25	..	3·57	56·73	1·04	1·99	9·81	6·56	..	..	79·70
1925-26	..	2·43	39·68	·47	1·55	8·20	5·14	..	..	57·47
1926-27	..	2·55	52·44	1·15	1·26	7·46	6·67	..	..	71·54
1927-28	..	5·18	61·00	1·19	1·95	9·12	5·90	..	..	85 09
1928-29	..	3·03	50·76	1·92	1·76	7·72	5·93	..	..	71·12
1929-30	..	4·47	35·93	·88	1·27	6·79	4·34	..	..	53·68
1930-31	..	2·70	23·68	0·25	0·71	6·35	3·59	..	..	37·28
1931-32	..	4·22	39·46	0·92	1·11	7·16	5·13	..	..	58·00
1932-33	..	2·95	42·49	3·55	1·24	8·36	6·93	..	Nepal	65·52
1933-34	..	2·07	47·55	2·95	1·18	8·43	4·42	..	0·20	67·00
1934-35	..	1·80	46·50	2·36	1·22	8·60	4·36	..	0·16	65·00
1935-36	..	1·12	43·32	3·24	1·04	7·86	2·79	..	0·19	59·56

It will be seen that during the war years Sambhar was called upon to supply unexpectedly large quantities to Bihar and small quantities to Bengal : otherwise its markets are fairly constant. The low issues in 1930-31 were chiefly due to the fact that the clearances during that year were mainly made from the salt produced in 1928-29 which was of bad quality. Hence the indenting in that year was less than in previous years. The normal requirements from Sambhar may now be taken to be about 65 lakhs of maunds. About two-thirds of this goes to the United Provinces, while Rajputana, Central India and the Punjab share practically all the remainder in order of importance as named. Small quantities also find their way into the Central Provinces and Bihar, but in the latter area Sambhar has nothing like the vogue of Khewra salt despite its shorter lead.

(B).—PACHBADRA.

(a) Historical.

The following local tradition exists as regards the past history of the source. It is related that in former times the bed of the valley was a saline marsh in which salt used to deposit during the dry and hot months of the year. The country was even more sparsely populated than it is now. The wild aboriginal tribes of the neighbourhood used to collect this salt for their own consumption and for sale to the inhabitants of the adjoining desert. About 400 years ago a man named Pancha, a Jat agriculturist by caste, lived in and owned a small desert hamlet which stood upon the present site of the town of Pachbadra. The story goes on to relate that 'Matajee', the goddess, appeared in a dream to a well-behaved member of the kharwal community called Jhanjah, a resident of Dahraseri in the Soojut Pergana and told him to proceed to Pachbadra, excavate a pit, and there salt would be produced for him. This man with about twenty of his brethern carried out the orders of the goddess. He visited Pancha's hamlet where he settled down and commenced systematic collection and sale of salt. He was joined by other kharwals and it was in this manner that the present community of about 200 households of kharwals in the town of Pachbadra took its rise. Several of these families claim descent from the original founder, Jhanjah kharwal. For some time they collected spontaneous salt from the hollows only. Later on they discovered that brine springs existed not far from the surface and began to dig pits and collect salt from there. It is also said that some fifty years later the goddess again appeared in a dream to a descendant of Jhanjah, and told him to dig under a certain jal (Salvadora Obsides) tree and there he would find her image. By carrying out this order the salt tract would extend for 10 miles from east to west and for 4 miles from north to south. On relating his dream to the people of Pachbadra, the orders of the goddess were carried out and the figures of two sisters, one called Sambara Matajee, and the other Asapura Matajee were found. For these figures the present temple on the salt tract, called "Mata-ki-than" was built. The kharwals present offerings at the temple even to the present day.

Prior to the occupation of the British, the Jodhpur Darbar took royalty on the salt produced and also levied a customs duty. Out of the total salt manufactured one-fourth was taken by the State. The duty levied amounted to ½ anna on each rupee worth of salt. The salt used to go to Mewar and Central India. The British Government took it over in 1878 at an annual rental of Rs. 1,70,000. At that time 534 pits were working. The eastern portion of the tract produced the salt most suitable for Banjara trade, but the brine supply was deficient and so the western section was developed. The eastern section is now studded with abandoned pits.

The salt source labours under many a disadvantage. About 1925 the source began to decay and from 1925 to 1928 it was in a moribund

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state. The decay of this source with its unpleasant climate, want of water, disabilities of its position and impossibility of competition with Sambhar and indolence of the kharwals appeared inevitable. The source worked at a loss and the Government in 1927-28 restricted the annual clearances to 3 lakhs. However, 1928-29 witnessed a sudden change due to over indenting and shortage of salt at Sambhar. The source proved an invaluable adjunct to Sambhar and output in 1929-30 jumped to about 15 lakhs.

(*b*) SITUATION.

The Pachbadra salt source consists of a long oval depression about 7 to 8 miles long and 3 to 7 miles broad. It appears that at some remote period it must have been the bed of a river. It is about 60 miles south-west of Jodhpur and a few miles north of the right bank of the river Loonee. It is situated in a scantily cultivated country. The salt tracts extend over 20 or 25 miles besides the salt source proper. The space occupied by the salt works comprises a length of about 6 miles of the bed of the valley with an average width of 2 miles. The pits from which salt is obtained are scattered all over this area, but the greatest number is in the western portion, so also is the brine stronger in that direction. Pits to the east are silted up and abandoned. In all there are about a thousand pits but only 300 working. Geologists consider that the salt comes from the Runn of Cutch in the form of fine dust carried by winds that blow over this region. The salt is deposited and is washed by rain. It collects and forms surface and subsoil brine. The drainage from an area of 350—400 square miles accumulates in the Pachbadra basin.

(*c*) SYSTEM OF MANUFACTURE.

Pachbadra salt is obtained by the solar evaporation of brine in large pits excavated to the level of the brine springs in the bed of the depression which forms the surface. These pits are on an average 300 feet long by 50 to 60 feet broad and about 10 to 12 feet deep. Some large pits 800′ × 90′ also exist. Brine having a density varying from 15° to 20°B percolates from the sides of the pit and upwards through the pit bed to a depth of about 3 feet and as evaporation proceeds, the inflow continues, until the pits are full of salt up to the brine level. The thorny branches of a desert shrub called "Morali" which grows on the sand hills of the neighbourhood are thrown into the brine, when it reaches a density of 25°B. This is done to facilitate the crystallization of salt. The day temperature is very high during the hot season and the atmosphere of the desert country in which the source is situate is extremely dry. A crop of salt is obtained from each pit at intervals of about 2 years. A pit when ready is generally opened 2 months after rains have stopped. The crust usually 3′ thick held together by the thorny branches embedded in it, is broken up with iron-shod poles, raked to the side, and spread out for a day or so to dry on a drying ledge just above the brine level. It is then cleared of its impurities and carried up in baskets and piled up in heaps on the edge of the pit. This system of manufacture has been followed for many generations past and is adapted to the local conditions.

After extraction of the saleable salt in a pit all the fine salt remaining in it is dragged out and heaped in a ridge just above the brine level.

This process is called "Ghalni". It opens out the brine springs and freshens the brine in the pit. During rains the fine salt is dissolved. A thorough cleaning and renovation of the pit becomes necessary after some years. A record of all operations to which a pit is subjected from time to time is kept. The average outturn from a pit 200′ × 50′ is about 10,000 maunds.

(*d*) EFFECT OF RAINFALL.

The average annual rainfall at Pachbadra is 12 inches. It, however, fluctuates. During 1932-33 the rainfall was about 23″, but during 1933-34 only 13.28 inches. A favourable rainfall renders the yield from the springs more copious and by diluting the brine tends to the formation of better salt as the result of retarded precipitation during the hot months of the year. A heavy rainfall also covers the tract with grass and bushes.

A deficiency of rainfall has a bad affect on the brine springs, the outturn and quality of salt. The brine becomes too highly concentrated and precipitation of salt goes on too rapidly. Consequently salt forms in small crystals and is not clean and pure, and is not liked by the trade. A prolonged drought causes a fall in the level of the brine springs with the result that with a less depth of brine the outturn diminishes.

(*e*) STORAGE.

The Kharwals, the manufacturers, are also responsible for storage of salt. When salt is extracted from a pit, it is first placed in heaps on the drying ledges in the pit just above the brine level to drain and dry for 48 hours. Afterwards it is removed to the pit bank for storage. It is stored in oblong heaps containing 5 to 20 thousand maunds of salt ; three-fourths of the contents of the heaps estimated by cubic measurements are first paid for, later on excesses or deficits discovered on clearance are adjusted. Bad or impure salt is not allowed to be stored.

(*f*) QUALITY.

The tract is divided into three sub-divisions Sambra, Hiragarh and Pusali. The salt produced is locally known by these very names. The Sambra salt is excellent. The crystals are irregular cubes, many of them exceeding an inch and a half in length. Hiragarh salt is smaller in size and less translucent. The Pusali salt is inferior being white and opaque and has small crystals. If the pits are well cleaned and floated with morali thorns and if there is good rainfall and a good time is allowed to salt to mature in the pits, the crystals obtained are pure white in colour and large in size. This salt is first class, and depends on good 'ghalni' and setting with 'Morali'. It is note-worthy that it is in these pits that are in clay, found chiefly in the Sambra section, that the largest crystals are formed. The pits in the sandy portions of the valley yield a greater weight of salt for their size, but the crystals are smaller and more opaque.

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(*g*) PRODUCTION.

The production since 1885-86 is shown in the following table together with the issues :—

Year.	Quantity of salt purchased. Mds.	Clearances. Mds.
1885-86	5,93,820	5,05,225
1886-87	5,47,496	4,91,576
1887-88	10,18,106	7,27,942
1888-89	6,81,046	6,53,453
1889-90	6,74,861	6,26,901
1890-91	4,94,669	4,70,166
1891-92	3,09,253	3,80,120
1892-93	1,15,389	4,80,263
1893-94	7,65,578	12,15,268
1894-95	11,09,214	8,50,818
1895-96	7,10,185	6,08,114
1896-97	7,22,765	6,54,102
1897-98	4,96,718	6,05,827
1898-99	7,72,303	7,81,574
1899-1900	10,42,199	11,37,396
1900-01	4,76,811	9,95,605
1901-02	9,83,818	11,11,215
1902-03	6,88,897	6,18,373
1903-04	6,72,633	4,85,188
1904-05	6,52,946	3,69,428
1905-06	4,59,317	4,06,091
1906-07	4,96,617	5,35,623
1907-08	5,67,371	6,17,124
1908-09	5,19,125	5,56,132
1909-10	7,78,498	6,38,292
1910-11	7,12,536	6,81,044
1911-12	8,90,483	7,68,685
1912-13	9,25,394	9,03,298
1913-14	11,08,361	10,14,870
1914-15	7,74,162	10,10,728
1915-16	9,69,711	9,53,976
1916-17	8,31,153	10,01,933
1917-18	5,46,628	5,14,521
1918-19	12,21,426	8,12,336
1919-20	7,07,040	7,46,199

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Year.	Quantity of salt purchased. Mds.	Clearances. Mds.
1920-21	13,10,862	4,84,984
1921-22	7,36,347	6,78,373
1922-23	1,72,391	7,53,125
1923-24	10,73,146	4,93,173
1924-25	95,530	7,43,022
1925-26	6,62,822	2,20,679
1926-27	56,825	3,01,467
1927-28	—11,107	4,20,590½
1928-29	5,22,795½	6,95,607
1929-30	14,96,192	12,84,444
1930-31	12,20,183	13,51,169
1931-32	5,37,515	7,94,276
1932-33	6,01,373	5,81,920
1933-34	9,68,899	5,82,554
1934-35	10,66,249	6,59,073
1935-36	8,63,072	10,57,539

The clearances represent total issues, some of them being duty free to the Jodhpur State. The production figures are not strictly accurate for the quantity excavated each year is but an estimate. The production figures vary, but not to such an extent as in the case of Sambhar. The variations are due to climatic conditions and other factors such as failure at Sambhar, scarcity of labour and deliberate restriction on production when markets are over-stocked or when a reduction in the salt duty is expected. The very low output of 1.56 lakhs in 1922-23 and .95 lakhs in 1924-25 was due to a strike of pit owners and double duty respectively. The maximum outturn 12.21 lakhs in 1918-19 was due to great demand for salt in that year owing to the stoppage of import of foreign salt due to the Great War. No salt was extracted during 1927-28 owing to big stocks in hand. Big output during 1929-30 and 1930-31 was due to greater demand on account of storage of supplies at Sambhar.

(*h*) COST OF PRODUCTION.

Formerly the price paid to Kharwals for manufacture and storage was about 9 pies per maund. If to this were added the cost of supervising establishment and the sum chargeable for the rent of the source, the average cost per maund came to about 4 annas a maund. The cost of production in these days is fairly high. It also depends on the total quantity of salt manufactured. Till 1914 the Kharwals were paid 9 pies, one anna and one anna three pies per maund according to quality. Their rate was gradually raised till in 1921 it was 2 annas 3 pies. It was reduced to one anna nine pies in 1926. At present the rates vary from Re. 0-1-6 to Re. 0-2-0 per maund depending on the quality of salt—the average being Re. 0-1-9. The total cost of production varies with the total output. During 1929-30 about 15 lakhs of maunds were produced and the cost based on direct and indirect charges worked out to three annas 1.6 pies per maund. With an output of 5 or 6 lakhs the average cost rises to about 5 annas a maund. The cost of production during 1935-36 worked out to Re. 0-5-6.01 per maund. Pachbadra salt in recent years had fallen into disrepute. The last two or three years have witnessed at first a gradual and later a rapid revival of trade. This is ascribable to the freight concessions allowed by the railway and improvement in the quality of the salt. There are good grounds for believing that Pachbadra salt has now established for itself a definite place in the markets, and that this will be permanent. There is at present a good demand for Pachbadra salt in certain markets.

(*i*) METHOD OF SALE.

Formerly there was the usual free indenting system. In 1929-30 the system of *pro-rata* allotment of wagons was introduced. This system too has been discontinued. At present there are two methods of sale at Pachbadra recently introduced (1) the annual allotment system and (2) the free indenting system.

Annual Allotment System.—Under the annual allotment system traders are invited to apply for not less than 50,000 maunds and for not more than 1,50,000 maunds of salt to be cleared during an official year. With their application they must deposit Rs. 1,000 as earnest money for each 50,000 maunds or a portion thereof applied for. The Commissioner allots the full quantity of salt applied for if the applications received are within the quantity of salt available for clearance under the allotment system. If, however, the quantity of salt applied for exceeds the limit fixed, the allotment is distributed between the applicants in proportion to the amount applied for. As soon as the allotment is sanctioned by the Commissioner, the allotment holders are required to execute an agreement with a security of Rs. 1,000 for each 50,000 maunds of salt. Under this agreement they are bound to clear the whole quantity of salt allotted to them within the year for which the allotment is sanctioned and not less than 4 per cent. of the total allotment should be cleared during any month.

If this condition is not observed, the allotment is liable to cancellation and the security money in whole or part is liable to forfeiture at the discretion of the Commissioner.

Free Indenting System.—Applications for Pachbadra salt under the free indenting system are received and dealt with by the Superintendent in charge, in the same way as at Sambhar.

Provided sufficient indents are received and wagons are supplied by the Jodhpur Railway, the Department clears salt at the rate of ten wagons daily for the allotment holders and 5 wagons daily for ordinary trade indentors on each working day. The General Manager may increase the daily rate of clearance at his discretion subject to the control of the Commissioner. As regards the disposal of excess indents received and the action in regard to non-supply of bags, the procedure is the same as at Sambhar.

(*j*) SELLING PRICE.

Up to 1882 salt was sold at varying rates from 2 to 5 annas a maund according to quality. The average price realised was about Re. 0-3-6 per maund. A uniform selling rate of Re. 0-3-6 was fixed in 1882-83. It was reduced to Re. 0-1-6 and then to Re. 0-1-3 in 1896 ; but was again raised to Re. 0-1-6 in 1902. It continued at this figure till 1921, when it was raised to Re. 0-3-6 as the source was working at a loss. A reduction to three annas was made with effect from July 1926, as the wages of the kharwals had then been reduced by six pies, but the price was raised to three annas and three pies in June 1927. It was again raised to four annas on 15th July, 1929, and then reduced by Re. 0-0-3 pies on 1st November, 1934, the price being Re. 0-3-9 with an additional dispatch charge of nine pies per maund. The dispatch charges were reduced from 9 pies to 6 pies per maund from the 1st October 1935. The selling price was reduced to Re. 0-3-0 from 1st April 1936. The total selling price including dispatch charges is at present Re. 0-3-6 per maund.

(*k*) Issues and Distribution.

Formerly salt from pits had to be conveyed to the railway station on pack animals, and there it was weighed and loaded into the metre-gauge wagons of the Jodhpur Railway. Rs. 30,000 were sanctioned by Government for two sidings one 6,600 feet eastwards and the other 12,500 feet westwards in extension of the railway line through the tract and the sidings were constructed in 1905. Since then direct loading from the stores into the wagons is possible. Salt is weighed into 2½ maund bags by petty officers. The bags are carried to selected sites served by railway sidings where they are test-weighed as at Sambhar by Inspectors or Deputy Superintendents who test-weigh 20 per cent. of the bags. The wagon load unit is 267½ maunds or 390 maunds. Salt is also issued to Banjaras through a contractor. The total issues of Pachbadra have already been given These issues have been distributed as follows. Figures are given in lakhs of maunds :—

Year.	Bihar and Orissa.	United Provinces.	Central Provinces.	Raj-putana	Central India.	Sind.	Total.
1906-07 ..	..	·27	1·16	1·64	2·27	·007	5·35
1907-08 ..	..	·19	1·30	2·62	2·04	·018	6·17
1908-09 ..	..	·05	1·06	2·54	1·89	·009	5·56
1909-10 ..	..	·09	1·26	2·87	2·13	·019	6·37
1910-11 ..	..	·69	1·26	2·98	1·86	·018	6·81
1911-12 ..	..	1·35	1·36	2·37	2 59	·014	7·68
1912-13 ..	..	1·55	1·74	2·77	2·95	·021	9·03
1913-14 ..	..	1·87	2·19	2·51	3·51	·018	10·15
1914-15 ..	..	2·80	2·11	3·05	2·10	·040	10·10
1915-16 ..	·48	2·42	1·87	2·72	2·04	·010	9·54
1916-17 ..	·31	2·57	2·14	2·84	2·16	..	10·02

Year.	Bihar and Orissa.	United Provinces.	Central Provinces.	Rajputana.	Central India.	Sind.	Total.
1917-18 ..	·48	·60	·06	1·75	2·25	..	5·14
1918-19 ..	·24	·92	1·01	4·31	1·53	..	8·01
1919-20 ..	·05	1·81	1·02	2·86	1·71	..	7·45
1920-21 ..	·01	·04	·83	2·30	·77	..	4·85
1921-22 ..	..	·80	1·06	3·32	1·60	..	6·78
1922-23 ..	..	·53	1·10	3·22	2·68	..	7·53
1923-24 ..	..	·13	·88	2·99	·93	..	4·93
1924-25 ..	..	·30	2·01	3·19	1·93	..	7·43
1925-26 ..	..	..	..	2·18	·02	..	2·20
1926-27 ..	·06	·05	·19	2·56	·10	·5	3·01
1927-28 ..	·24	·74	·17	2·80	·25	..	4·20
1928-29 ..	·18	2·37	·25	3·84	·16	..	6·80
1929-30 ..	·04	6·77	·65	4·21	1·08	..	12·75
1930-31 ..	..	8·36	1·01	3·00	1·10	..	13·47
1931-32 ..	..	3·77	·85	2·47	·74	·02	7·85
1932-33 ..	·02	1·93	·19	3·18	·27	·01	5·60
1933-34 ..	·04	1·72	·25	3·53	·22	·01	5·77
1934-35 ..	·06	2·20	·24	3·53	·48	·04	6·55

In olden days Pachbadra was the staple salt throughout the greater part of Rajputana, the whole of Central India and the adjoining districts of the N. W. Provinces and the Central Provinces. Pachbadra was not connected with the railways. All trade was in the hands of the Banjaras who took away salt on camels, carts and donkeys. The salt source was at a disadvantage owing to the remoteness of its position, and could not compete with Sambhar. The Jodhpur railway was extended to Pachbadra in 1887, and the Through Traffic system was introduced. Salt began to go over the Rajputana, Malwa, Indian Midland and G. I. P. Railway. Beawar, Bhopal, Bhilsa, Saugar, Jubbulpur and Udaipur were the chief centres of distribution. Since 1927-28 the Jodhpur Railway have reduced the freight on their line so that the freight on a consignment of salt booked from Pachbadra to any place beyond Sambhar would be no more than the freight on an equal amount of salt booked from Sambhar to the same destination. This has placed Pachbadra on an equal footing with Sambhar. The salt now goes to the United Provinces, Central Provinces, Berar, Central India and Rajputana. Pachbadra is likely to regain its old markets in the United Provinces and in Central India in such places

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evenings along with sodium chloride. The salt is inferior to Sambhar salt ; though white, it gets discoloured during collection and storage, or owing to sand storms. If manufactured with care, the salt is in the form of agglomerated crystals. The salt is preferred in certain markets such as Muzaffarnagar to Sambhar salt.

(*f*) PRODUCTION.

The table below gives the figures of output. Output from 1878-79 to 1899-1900 is given in some typical years only. From 1903-04 onwards it is given for each year :—

Year.	In lakhs of maunds.	Year.	in lakhs of maunds.
1878-79	5·54	1916-17	4·22
1880-81	3·85	1917-18	1·97
1885-86	4·91	1918-19	3·32
1890-91	2·64	1919-20	5·18
1894-95	4·16	1920-21	2·71
1899-1900	2·38	1921-22	6·92
1903-04	2·14	1922-23	7·49
1904-05	2·93	1923-24	3·23
1905-06	3·47	1924-25	4·02
1906-07	2·86	1925-26	1·23
1907-08	3·35	1926-27	3·75
1908-09	2·90	1927-28	3·17
1909-10	2·73	1928-29	2·87
1910-11	3·17	1929-30	3·85
1911-12	4·04	1930-31	5·34
1912-13	3·27	1931-32	4·55
1913-14	2·89	1932-33	2·51
1914-15	3·78	1933-34	1·69
1915-16	3·51	1934-35	1·41

The figures given for output are for financial years and include the excesses found on clearances of heaps within the year. Deficits were very rare. The production, it will be seen, varies considerably from 2 to 7 lakhs but this is due more to restriction of manufacture than to climatic conditions, for the source has ample supplies of brine and is very seldom affected by excessive or deficient rainfall. If necessary, it can be relied on to produce six lakhs of maunds.

(*g*) COST OF PRODUCTION.

Formerly the manufacturers were paid Re. 1-0-0 to Rs. 1-9-0 per hundred maunds. Then the rate was raised to 2½ pies per maund. There were three different rates 2, 2½ and 3 pies per maund according to quality. About 1918-19 the rate varied from 3 to 5 pies per maund. The pan workers are now paid 7 to 9 pies per maund for manufacture of salt alone according to the quality of salt produced, while for storage of salt 5½ pies to 7½ pies per maund are paid in addition according to the distance.

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The average cost of manufacture and storage is one anna four pies per maund. From the year 1927-28 the figures for this source are exhibited separately in the commercial accounts, and the average cost of production in the years 1928-29, 1929-30, 1930-31, 1931-32, 1932-33, 1933-34 and 1934-35 worked out as Re. 0-3-3.99, Re. 0-2-4.74, Re. 0-2-4.13, Re. 0-2-6.23, Re. 0-2-8.94, Re. 0-3-0.27 and Re. 0-3-3.62 per maund respectively. Interest on capital and establishment charges being low and the major portion of the rent being debitable to ' protection ', the factory usually works at a profit.

(*h*) System of sales.

A few treasuries such as Hissar, Rohtak, Bikanir and Sambhar are authorised to accept revenue for Didwana salt. Money is deposited there and indents are sent to the Superintendent in charge by the treasury officer. Salt is not dispatched departmentally by rail but is delivered to traders at the heap. Traders make their own arrangements to convey it to the Balia railway station 1½ miles away. The wagon load unit is 267½ maunds or 390 maunds. Salt is removed on pack animals by Banjara pedlars. This is issued through a contractor who collects the revenue and pays it bi-weekly into the Sambhar treasury and issues the salt to the Banjaras after weighment by the Inspector or Superintendent. The Banjara contractor is allowed to levy a fixed commission per maund on the quantities issued. The selling price at present is Re. 0-2-6 per maund, the traders bearing all the charges for removal.

(*i*) Issues and Distribution.

The Issues and Distribution of Didwana salt are shown in the table below :—

In lakhs of maunds.

Year.	Punjab.	United Provinces.	Rajputana.	Total.
1907-08	1·97	..	·94	2·91
1908-09	1·05	..	1·09	2·14
1909-10	1·77	·36	1·11	3·24
1910-11	2·10	·38	1·31	3·79
1911-12	2·32	·10	1·09	3·51
1912-13	2·62	·01	1·19	3·82
1913-14	2·38	..	1·02	3·40
1914-15	3·00	·02	1·59	4·61
1915-16	2·85	..	1·11	3·96
1916-17	3·37	..	·97	4·34
1917-18	1·21	..	1·04	2·25

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(In lakhs of maunds.)

Year.	Punjab.	United Provinces.	Rajputana.	Total.
1918-19	1·52	·08	·33	1·87
1919-20	3·89	·71	·78	5·38
1920-21	1·15	·48	·86	2·49
1921-22	2·01	2·01	1·11	5·13
1922-23	3·99	3·39	1·27	8·65
1923-24	·76	·39	·54	1·69
1924-25	3·63	1·27	1·01	5·91
1925-26	1·15	·41	1·22	2·78
1926-27	2·06	·32	1·07	3·45
1927-28	2·05	·29	1·07	3·41
1928-29	1·55	·43	1·02	3·10
1929-30	1·16	1·28	0·89	3·33
1930-31	1·10	0·83	1·07	3·00
1931-32	1·14	0·92	1·13	3·09
1932-33	1·16	0·52	1·08	2·76
1933-34	1·56	0·63	1·24	3·43
1934-35	0·94	0·09	1·31	2·34

Formerly the nearest railway station to Didwana was Kuchaman Road (Nawa) at a distance of 40 miles from it. A considerable quantity of Didwana salt was conveyed by camels on bullock carts to Kuchaman Road and distributed from there by rail. Another large portion went by road across Bikanir and Shekawati to Bhiwani. From there it went by road to Rohtak, Hansi and Hissar, etc., or by rail through Delhi to Sharanpur, Muzaffarnagar and Meerut districts. If there was a shortage of salt at Sambhar, Didwana salt made headway. Now-a-days this salt is distributed from Balia station to Bhiwani, Hissar, Rohtak and Muzaffarnagar, etc. Some salt is consumed in the neighbouring portions of Jodhpur State. Salt also goes to Bikanir, Shekawati, etc., by road.

This salt has always had difficulty in competing on level terms with either Sambhar or Pachbadra owing to the relative poorness of its quality. During the last few years it has been ousted from certain Punjab markets by refinery salt on which the rate of duty is much lower.

C.—OTHER SALT SOURCES.

The soil throughout Rajputana is more or less impregnated with salt substances, so much so that it is rare to see a low spot without more or less efflorescence on the surface. Salt works existed in most of the States. Agreements or treaties were negotiated with the Native States. The more important sources were leased by the British Government, others were closed. Important ones are given below :—

(*a*) FALODI.

This salt source is a depression about 5 miles by 3 miles and salt used to be manufactured here under the same system as at Didwana. The Falodi town is situated midway between Jaisulmer and Bikanir, but on the N. W. Frontier of Jodhpur and about 70 miles distant from the Jodhpur town. The source was leased by the British Government in 1878 from the Jodhpur Darbar. The production and sale of salt ranged from fifteen to fifty thousand maunds per annum. The salt was distributed to Jodhpur, Bikanir, Bhawalpur and Jaïsalmer. The source was so inaccessible that the produce could not be economically placed on the market and as the business of Sambhar and Pachbadra increased under the stimulus of railway communication, sales at this source gradually fell off. Bikanir Durbar drew considerable supplies from the place. As soon as the Jodhpur Bikanir Railway was opened, placing Sambhar and Pachbadra in direct railway communication with Bikanir, the source was closed in 1897. Compensation is paid to the manufacturers.

(*b*) LUNI SALT TRACT.

The river Luni takes its rise in the hills west of Ajmere and flowing near Jodhpur and under Pachbadra, Balara, Boyatra and Bakasir falls into the Runn of Cutch at the point of junction between the three Frontiers of Sind, Rajputana and Gujrat. At the mouth of the Luni river where it enters the Runn of Cutch, a large delta has been formed by the annual floods with numerous deep channels. During the dry months of the year, when the bed of the main stream is perfectly dry, brine percolates into these channels and salt of good quality forms in thousands upon thousands of tons annually. It is swept away when the river comes down in floods in the monsoon. Salt also forms in a sheet over the end of the Runn itself when the wind causes an accumulation of brine at its head. The country around is desolate. The nearest railway station is about 100 miles distant. This existence of vast deposits of natural salt was fraught with danger to salt revenue, so the Luni Salt Tract was leased by the British Government from the Maharaja of Jodhpur in 1878. Under the lease Government got control over the entire course and estuary of the river Luni from near Balotra to the Runn of Cutch. It was not found profitable to sell the salt. A Preventive Establishment was stationed to guard the salt, and the system of free distribution of salt to the local inhabitants was introduced. This system goes on till the present day. About four to five thousand maunds are annually distributed at the rate of 6 seers per head per annum. The tract was closed in 1887-88 so far as collection and sale of salt are concerned. At present an Inspector is stationed at Bhatki for 6 months each year. He and his staff prevent the removal of salt from the numerous and extensive deposits in the Luni river and the channels of its delta.

(*c*) KACHOR REWASSA.

This source in the Jaipur State was leased by the Maharaja to the British Government in 1878. The local manufacturers, however, refused to sell salt to the British Government and as the Department was not prepared to agree to the source being worked without direct control over the sales, the manufacturers abandoned their factories for agriculture and the source has remained closed ever since. The source was at a distance from the railway and could not have been profitably worked in competition with the adjacent sources of Sambhar and Didwana.

(*d*) BHARATPUR.

Bharatpur had big salt works which for many years formed the principal source from which the salt consumed in the North Western Provinces was drawn. Salt was produced by the solar evaporation of brine drawn from wells. The Maharaja was unwilling to lease the works to the British Government. Bharatpur salt could not compete with Sambhar the price of which was much diminished by reductions in the cost of production and transport. So the works were closed by the Maharaja in 1876-77.

(*e*) BIKANIR.

Bikanir has the source of Lonkaran Sarr situated at a distance of about 50 miles from Bikanir. This is a depression about 2 miles long and 1½ miles broad and brine springs are found below this. Pits are dug in the depression and brine is used to manufacture salt by solar evaporation. The State manufactures salt even to this day.

(*f*) JAISALMER.

This State has a salt source called 'Kanod'. Salt is manufactured from brine obtained from pits sunk to a depth of about 10 feet. The source is situated in a desert and desolate country.

E.—PREVENTIVE MEASURES.

Preventive measures are necessary to ensure the levy of duty upon Government salt and for the exclusion of non-duty paid salt. The salt revenue establishment posted at Sambhar, Pachbadra and Didwana supervises the manufacture and storage of salt. The duty, price and any other charges are pre-paid in treasuries, and the establishment have no cash dealings of any kind with the traders. No salt can be issued except under authorities signed by the Assistant General Manager, Sambhar or Superintendents in charge of the sources. The salt at the Central Store, Sambhar, or Gudha is under guard. Guards also watch the heaps of salt at Nawa or Didwana. At Pachbadra a line of sentry posts surrounds the salt works. A Preventive establishment under an Inspector at Bhatki guards the Luni Salt Tract. The General Manager, Rajputana Salt Sources, has power of a First Class Magistrate and can try cases of contravention of the India Salt Act. In 1933-34 there were 3 offences against salt laws, 5 persons were arrested and about 20 maunds of salt was seized. There were no offences during 1934-35.

The manufacture of salt in the Native States of Rajputana and Central India, except at the sources leased to the British Government, and export from the States authorised to receive salt from the sources

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leased by the British Government free of duty or free of price and duty, are prohibited by the salt agreements entered into between the Durbars and the British Government. Some States such as Gwalior, Datia, and Jaisalmir are, however, permitted to manufacture certain fixed quantities of salt for their local consumption, but export of such salt outside the State concerned is prohibited. Officers are periodically deputed by the Department to these States to watch the proper observance of the agreements. Salt which has been issued free of duty or free of price and duty is, therefore, excluded from the area within which salt paying duty to the British Government is consumed and so also any salt which some of the States are permitted to make for local consumption.

F.—HISTORY OF ADMINISTRATION.

In the beginning, the Sambhar Lake was one division under an Assistant Commissioner. Didwana and Pachbadra were each under a separate Assistant Commissioner. Didwana and Pachbadra were reduced to circles under the charge of Superintendents in the years 1911 and 1925 respectively and in the latter year all the Rajputana Salt Sources were placed under one General Manager (Pay Rs. 1,100—50—1,400), the division being called the Rajputana Salt Sources Division of the Northern India Salt Revenue Department. There is an Assistant General Manager at Sambhar (Pay Rs. 700—25—900). Superintendents (Pay Rs. 250—50|3—600) are in charge of Manufacturing Circles such as Nawa, Gudha-Jhapog, Deodani, Main Line, Pachbadra and Didwana. The Sale Section at Sambhar is under a Superintendent called Superintendent in charge weighments. A circle is a unit of administration. The subordinate staff consists of Deputy Superintendents (Pay Rs. 200—10—300), Inspectors (Pay Rs. 80—4—140—5|2—160), Kotegashts, Jemadars and peons. The executive staff of the division thus consists of one General Manager, one Assistant General Manager, one Engineer, 7 Superintendents, 4 Deputy Superintendents and 15 Inspectors. The preventive work, besides the main work of manufacture, storage and issue of salt is attended to by officers in charge of circles.

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CHAPTER VIII.

Mandi Salt Mines.

(*a*) HISTORICAL.

The quarries in Mandi State have been worked from times immemorial. No authentic records of early times exist. Dr. Jameson in his report (March 1843) gives a graphic description of the Mandi Mines. Mr. Leppel Griffin, Under Secretary to the Government of the Punjab in " The History of the Punjab Rajas " throws some light on the subject. He states with respect to Mandi salt that " in 1820 the price of salt at the mines was 7 annas, in 1846, 8 annas, and in 1864, 12 annas per maund. In 1845 the revenue from the salt was Rs. 60,000. In 1850 it had risen to Rs. 83,000 and in 1862, to Rs. 1,00,545. There was a decrease in 1867-68 on account of the great quantity of rain that had fallen during the year which hindered the working ". Mr. Barnes, then Deputy Commissioner of Kangra, in his report on Mundee for 1850-51 said " The sale of Mundee salt yielded last year, when British salt was double its present price, Rs. 83,000. I am confident that this sum will never be realised again under the same circumstances which are not likely ". These show total amounts realised as salt revenue. " The cost of establishments and working ", Mr. Leppel Griffin estimates, " is about 20 per cent. on the amount of salt sold ". Prior to 1871 the whole revenue realised from the sale of salt at the quarries situated in the Mandi State was received by the Raja, whose property they are, the sale price being 10 annas a maund as fixed in 1846 on the annexation of the Jullundar Doab by the British Government. There was no duty. From the year 1865 to 1869 nearly a lakh of maunds of Mandi salt entered into the British territory annually and replaced Khewra salt on which the levy was much higher. So the quarries were first visited by an English Officer in 1869-70 and the British Government started negotiations with the Raja to check diffusion of this salt into British territory or to recoup them for the loss of revenue sustained by them. Thus Government establishment was first entertained at the mines under Government of India's orders in 1870. An Inspector of the Inland Customs Department was first stationed at Mandi mines in December 1870. His duty was to register the sale of salt from the quarries at Guma and Drang. On this salt it was decided that the Raja of Mandi should tentatively impose a duty of 10 annas a maund in addition to the selling price of 10 annas a maund. Thus the total selling price fixed was Rs. 1-4-0 a maund or 32 British seers per rupee. This duty of 10 annas was to be paid by the Raja to the British Government on all salt imported into the British territory.

Sales with new duty began from 1st February 1871. In the first two months 21,792 maunds were sold out of which 13,227 maunds went to British territory. Prior to posting of the British officer a system of barter prevailed there. The Raja's establishment took wood, meat, ghee, etc., in exchange for salt. Of course, no account of such sales went to the Raja. This was prohibited and all payment was ordered to be made at the mines. Salt trade in those days laboured under great difficulties ; salt was not always available and buyers had to wait. The country being

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sparsely populated, the news that salt was available took some time to filter through. There was shortage of labour as well. In case of epidemics amongst the cattle, no carriage was available and the salt trade suffered.

The duty of the British officer posted there was to see that destinations were correctly registered and that salt was sold at the correct rate ; but many traders gave wrong destinations. The State officials did not like the new arrangements and so did not co-operate. The working and control of the quarries was in their hands.

This arrangement for registration of destinations of sales, etc., having not proved satisfactory, it was decided in 1880 to abolish it and to divide the duty of 10 annas a maund levied on all salt in the ratio of 2 to 1 between the British Government and the Raja. In 1883 the Raja represented that the reduction of the Government rate of duty in 1882 was injuriously affecting the sale of Mandi salt in British territory. The Government of India issued orders in 1884 reducing the duty from 10 to 6 annas a maund. Government was to receive 4 annas a maund and the Raja 2 annas. The total selling price was accordingly reduced from Rs. 1-4-0 to Re. 1 a maund. In 1888 the selling price was raised to Rs. 1-2-0 a maund (price 10-6-0 and duty Rs. 7-6-0), British Government getting 5 annas and the Raja 2½ annas out of the proceeds of the duty. The Mandi salt contains about 25 per cent. impurities. Moreover, the cost of production was very high, so the Government of India ordered that the duty was to be kept at about one-fifth of that in force in British India.

In 1889 the Raja was permitted to raise the price per maund to 10½ annas at which figure it still stands. In 1886 Mr. Patterson, with a view to reducing expenditure, put forward a proposal for the removal of the establishment maintained in Mandi on the Raja's agreeing to pay over a lump sum annually equivalent to two-thirds of the average total duty levied, arguing, that as the basis of division had been satisfactorily established no sufficiently useful purpose was served by the retention. This proposal did not commend itself to the Punjab Government and was dropped. It was revived by Mr. Strickland when officiating as Commissioner, Northern India Salt Revenue, in 1922 and received the approval of the Mandi authorities, the Punjab Government and the Government of India. The arrangement made was to remain in force for five years in the first instance, the sum agreed upon for the composition being Rs. 19,000 annually, subject to proportionate revision in the event of any increase or decrease in the rate of duty in British India. The arrangement then made whereby the duty on Mandi salt was fixed at approximately one-fifth of that in force in British India was maintained, but the State was given liberty to increase or decrease the price of salt. The staff of Northern India Salt Revenue Department, costing some Rs. 7,000 annually, posted at the quarries was entirely withdrawn from the 1st July, 1922, but the Department retained the right of inspection of the registers, quarries, etc., and the State undertook to maintain such registers as the Commissioner, Northern India Salt Revenue might require and to permit inquiries regarding the information contained therein. The question of revision of the Agreement made in 1922 for five years was taken up and after some correspondence the Government of India were pleased to fix the composition amount at Rs. 6,000 per annum. They also agreed that the duty which the Durbar must levy might be maintained at Re. 0-3-9 per maund. This rate is subject to revision in consequence of any change in the rate of British Indian duty. It has been made clear to the Durbar that such revision will not necessarily be proportionate, but that the maximum increase which the Government of India might require the Durbar to make in their rate of duty shall not be more than the amount by which the British Indian rate is increased. On the representation of the Durbar the Government of India have, however, agreed to the retention of the 1 : 5 ratio between the Mandi duty and the British Indian duty as heretofore till the end of the present agreement which is to remain in force for a period of 10 years with effect from July, 1927, when the old Agreement expired.

(*b*) SITUATION, ETC.

The two Mandi salt mines are situated in the Himalayan State of Mandi which lies between 76° and 77° east longitude and 31° and 32° north latitude and are the property of the Raja. Up to 1927 there were two quarries, one at Guma in the bed of the Guma gorge and the other at Drang. Guma and Drang are now mines both situated on the Jogindar Nagar-Mandi road. Guma is at about 7 miles from Jogindar Nagar and Drang is 18 miles further away from Guma. Mandi town is 11 miles beyond Drang. An open quarry is also being worked at Maigal since 1931—about 5 miles from Mandi.

Geologically there are indications of a continuous saliferous deposit along the western base of ' Ghoghar-Ki-Dhar ' Range in its subsidiary ridges from Maigal to Guma—a distance of about 25 miles. The chief indication of the presence of salt in this range is the deposits of ' Lokhan ', a residue from impure rock salt which has been acted upon by water. A peculiar soft various coloured earth is associated with Mandi salt in the same way as gypsum and red marl are found associated with the salt of the Salt Range. Large quantities of this earth outcrop and indicate the existence of salt. At Drang the exposures of this earth are very striking. Brine springs are also met with at Deihreh in Kangra. The importance of this local salt source in a remote and mountainous region into which Khewra salt penetrates with difficulty cannot be over-estimated.

(*c*) SYSTEM OF MANUFACTURE.

(i) *Old System.*

Salt has been excavated both at Guma and Drang from times immemorial. Mining or quarrying was practised at both places but not on a large scale. Mr. Leppel Griffin states, " there is at neither place excavations such as in Europe would be called mines, the salt being dug out of the face of the cliff or from shallow open cuttings. At Gooma the salt is dug from a gorge some 500′ below the village to which it is carried to be weighed and sold ". The little mining done must have been discontinued. From 1860 to 1926 only quarrying was done.

Guma.—The Guma quarry was situated in the bed of the Guma gorge. Salt surface was exposed by removing the surface crust of the gorge bed to a depth of 10′ to 30′. This was worked till rains set in and filled the whole quarry with debris flush with the gorge bed. A new site had to be selected next year higher up the bed of the gorge and the

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process started afresh. Salt was won by burrowing into the seam till the hills above descended into an avalanche of loose stone and earth which used to bury the working many feet deep. The work of clearing was done partly by manual labour and partly by diversion of the gorge stream to the spot.

Drang.—At Drang the system of working was the same Heavy land slips occurred there also and filled the quarry completely as at Guma, though this quarry was better situated than Guma. Salt at Drang, however, was obtained under greater difficulties than at Guma. The management and working of the quarries was in the hands of State officials. The method of work was wasteful and unsystematic. Only the upper portion of the seam was skimmed off as it were, but the lower portions were lost for ever. Some British Officers, for instance Messrs. Bolster and English, visited the mines and suggested improved methods of working, but their suggestions were never carried out. Even slight showers of rain buried the quarries and brought the trade to a standstill. One difficulty in the way of systematic working was want of accurate knowledge regarding the direction and depth of the salt stratum. The second problem was protection of the workings from annual destruction by the descent of the hill side. The State authorities, however, did not care to get expert advice and work systematically.

(ii) *Present system.*

Since 1927 underground work has been started in place of open quarries and systematic work of driving tunnels and chambers is being done at Drang. About 50 miners are employed at Drang, and the average annual output is about 70,000 maunds.

Mining at Guma is still unsystematic, though efforts are being made to bring it into a regular system. The number of miners here is 40, and the average annual output about 45,000 maunds. Guma salt is considered superior to Drang salt.

There is an open quarry at Maigal. This was started in 1931 to ascertain the existence of salt so that it might prove useful for the development of the Drang salt mine. About 10,000 maunds of salt are annually excavated from this quarry.

(*d*) BRINE SALT.

For the last 4 to 5 years a small quantity of salt is also manufactured from brine at Drang by solar evaporation. In rainy season water enters the salt pits and sometimes sweet water is also made to enter into the pits. After 2 or 3 months, the water gets saturated with salt and turns into strong brine. A syphon is installed from the salt pits to fields which have cemented floors. They are, as it were, the crystallizing pans. Salt is manufactured by solar evaporation. In summer months, April to June, salt is scraped every day, but in winter, October and November, every third or fourth day. Manufacture of this salt is in an experimental stage only. About 1,500 maunds are annually manufactured. The selling price is Rs. 2 per maund. The salt is sold in the Indian States only, its export to British territory being prohibited.

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(*e*) QUALITY.

The salt is of dirty plum colour with deep red clay finely disseminated in it and is of very inferior quality. It contains about 73 to 87 per cent. of sodium chloride, the rest being impurities, earth or marl. Sometimes it is mixed with quartzite, sand stone and lime stone pebbles. The impurities are insoluble and separate when salt is dissolved in water. It cannot be used for human consumption in the form in which it is quarried, though it is given to cattle in the natural state. For alimentary purposes it is purified by being melted, strained and recrystallised by boiling or the strained and clarified brine itself is used. Brine salt which is being manufactured in small quantities is, however, just like Sambhar salt, used as it is.

(*f*) PRODUCTION.

The following table gives the output of salt in some typical years (every fifty year), from 1871-72. From 1917-18 onwards the output is shown for each year :—

Years.	Output in maunds.	Years.	Output in maunds.
1871-72	1,30,150	1921-22	1,25,011
1875-76	1,30,331	1922-23	1,20,785
1880-81	1,13,429	1923-24	1,34,269
1885-86	1,22,370	1924-25	1,31,154
1890-91	1,30,716	1925-26	1,23,230
1894-95	1,28,789	1926-27	1,17,278
1899-1900	1,26,939	1927-28	1,04,815
1904-05	1,13,104	1928-29	99,070
1910-11	96,695	1929-30	86,697
1915-16	1,03,771	1930-31	1,22,309
1917-18	1,22,761	1931-32	1,03,848
1918-19	1,34,658	1932-33	1,12,255
1919-20	1,29,628	1933-34	99,969
1920-21	1,46,362	1934-35	1,18,401

It will be seen that the output does not much vary from year to year. The area of consumption of this salt is almost fixed ; practically the whole of the salt quarried is sold off, very little stock, if any, being maintained.

Cost of production.

As the system of manufacture up to recent years was rather wasteful, laborious and even dangerous, the cost of production was somewhat high. The cost of production at Drang and Guma now is about 1½ and 2 annas a maund respectively excluding supervision charges ; including supervision charges it comes to about 3 annas a maund. The cost of production of brine salt comes to about 6 annas a maund.

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(*g*) *Issues.*

The selling price of salt was first fixed at 10 annas a maund in 1847, when there was no duty. As explained before the untaxed Mandi salt became a menace to the salt revenue in British India and steps were taken to check its diffusion into the British territory. The system of sale by barter was abolished in 1871 when an Inspector of the Inland Customs Department was stationed at Mandi to register sales, etc. Most of the salt those days went on bullocks, donkeys, goats, etc. ; besides thousands of men took away salt as head loads, as retail sales of even 8 seers were permitted. Head loaders were required to give a day's manual labour free, before they were allowed to purchase salt. Sales were much interrupted owing to there being no stock of salt or due to cattle diseases or heavy rains. When wheeled traffic started, the number of head loaders gradually decreased.

The following table gives the issues since 1917-18 :—

Year.	Issues maunds.	Year.	Issues maunds.
1917-18	1,33,801	1926-27	1,19,449
1918-19	1,31,922	1927-28	1,07,231
1919-20	1,29,672	1928-29	1,07,306
1920-21	1,45,619	1929-30	94,029
1921-22	1,26,617	1930-31	1,14,396
1922-23	1,22,549	1931-32	1,02,392
1923-24	1,19,127	1932-33	1,19,464
1924-25	1,31,225	1933-34	94,250
1925-26	1,22,215	1934-35	1,23,602

The total annual issues have been practically the same as the average output, about 1,30,000 maunds, the Drang quarry supplying about 70—80 thousand and the Guma quarry about 50—60 thousand. The present rate is Rs. 1-4-0 a maund. The Durbar is authorized to increase or decrease the price. The salt at both the mines is sold on cash payment. It is transported in lorries or carts, or on pack animals. The sale proceeds are remitted to the State treasury at Mandi daily through the regular lorry service from Joginder Nagar to Mandi.

(*h*) DISTRIBUTION.

Mandi salt has always been consumed in the State of Mandi, Suket, Chumba, Bilaspur, and Rampur Bushahar and in the adjacent British territory. From about 1850 to 1870 about one lakh maunds of this salt annually went into the Simla, Kulu, Kangra, Hoshiarpur and Jullundur Districts. When the price was raised, imports into British territory gradually decreased and this salt was replaced by Khewra and Warcha salt. Guma salt used to come to British territory and Drang salt went to Native States. Sales to Simla fell off with the opening of the Ambala-Kalka Railway.

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The average quantity sold is about 1,30,000 maunds. The produce of the Mandi quarries is consumed throughout the entire area of the Kangra district, including Kulu ; in parts of the Gurdaspur and Hoshiarpur districts ; in the Simla hill States, and in the hill States of Mandi, Chumba, Suket, Bilaspur and Rampur Bushahar. Its boundaries may be said to be fixed, though, to a certain small extent, Punjab rock-salt sometimes drives it back slightly in the Hoshiarpur and Gurdaspur districts and in the Simla hill States, or is in turn driven back, according to the seasons, the state of the roads, and the scarcity or abundance of transport. The salt is far inferior in purity to any salt paying full duty, but as the people of the remote hill tracts and districts named have always been in the habit of using it the British Government allow its production and sale, although it inevitably displaces salt which has paid full duty.

(*i*) HISTORY OF ADMINISTRATION.

The Mandi salt mines are the property of the Raja and have always been worked by the State. In 1870 an Inspector of the Inland Customs Department was stationed at Mandi with two sub-deputy Inspectors and establishment to register sales of salt to British territory. A Superintendent was posted in 1878-79. An extra Inspector was sent in 1892. Two Inspectors with charge allowances were posted to the two quarries instead of a Superintendent and Inspector without allowances from July 1901. The management and working of the quarries was in the hand of the State. Other Goverment officers visited the quarries from time to time but only to give advice. The Northern India Salt Revenue establishment was entirely withdrawn from 1st July 1922.

At present there is one Inspector (appointed by the State) in charge of Drang Mine. There is a mine Overseer at Maigal quarry and a sub-Inspector at Guma mine. The Inspector in charge of Drang also supervises the work of these two places. The Department is under the administrative control of the State Engineer P. W. D.

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CHAPTER IX.

Sultanpur Salt Works.

(*a*) HISTORICAL.

(*i*) *Sultanpur Salt Works.*

The Sultanpur Salt Works are situated in the Gurgaon and Rohtak districts of the Punjab. After the Mutiny in 1857, when the British Government annexed the lands of Jhajjar and Farrukh Nagar, the salt works which belonged to the Nawabs came under their control. The Sultanpur Mehal was formed by combining these with some adjoining villages that had previously lapsed to the British Government on the death of Begam Samru. For many years this was one of the principal sources which supplied salt to the North Western Provinces. The works were adjacent to the grand Preventive Line.

There were altogether 10 manufactories in the Mehal of Sultanpur ; 3 in Gurgaon and 7 in Rohtak district. The works were leased out and the monopoly of manufacture was given to the contractors. The party who leased the monopoly were bound under a penal bond called 'Muchalka' to maintain and supply a sufficient number of chowkidars to prevent theft of salt.

The works were under the jurisdiction of the Inland Customs Department and were supervised by a special establishment which consisted of Assistant patrols, Moharrirs, Kotgashts and peons and was under a European officer. This establishment was first posted in 1859 by withdrawing men from some posts on the grand Customs Line. Their duty was to watch the factories, examine the pits and beds of salt and to see that the chowkidars did their duty.

About 1869-70 the works were divided into two groups. The most important of these consisted of 10 great clusters collectively known as the Sultanpur Mehal and the other as Nuh Works. These were above and out of the Inland Customs Line. Government supervision about this time was confined to settling disputes between manufacturers and traders. Government also levied a small cess which represented the share of the native administrations to whose rights it had succeeded. The salt paid duty on crossing the line. The cess varied from works to works from 0-0-6 to 0-1-9 per maund. It represented the share of the State in the produce of the soil, was analogous to land revenue, and was paid to the Punjab Government. With the British occupation, the produce of the works gradually increased. The salt belonged to the manufacturers, who arranged its sale direct. Government was only concerned with excise duty and cess. The works were at Mubarakpur, Busserpur, Sadrana, Balpur, Saidpur, Mahamudpur, Sylana and Kalliwas. The output varied from 5 to 6 lakhs maunds per annum. It gradually fell after 1885.

It was considered that the cess pressed hard on the industry ; it was accordingly reduced to 3 pies per maund from January 1896. This too failed to revive the works. The causes that contributed to their decline are discussed later. The output kept on falling till about 1922-23 it fell to about 30,000 maunds and the works were closed.

In 1931-32 a licence for the manufacture of salt was granted to a firm of two respectable refiners, who started reconstructing old pans in February 1932. The manufacture of salt went on till August 1934 when orders for the closure of the works were issued, as they did not prove a success. The works were finally closed from 22nd April 1935.

(ii) *Nuh Salt Works.*

Besides the Sultanpur group, the other group was called the Nuh Mehals. As at Sultanpur, numerous clusters of works situated in different villages were included in this group and the produce of several clusters varied greatly in quality, appearance and market value. Here the salt was manufactured in deep vats, where the brine took several months to evaporate and not in shallow pans as at Sultanpur. The manufacturers here were deep in the books of the bankers. The salt was of bad quality and was called Salumbha. In the beginning the salt was bitter. It became saleable only when after having been pitted for a long period certain foreign constituents were eliminated by some obscure chemical process in Nature's underground laboratory.

The Works were situated about 40 miles from Muttra Railway station. From there the salt reached Hathras which was its chief mart and distributing centre. Traders adulterated Sambhar salt with this or foisted it on the market as Sambhar salt. The output and sales from 1867-68 to 1880-81 varied from one to two lakhs of maunds per annum. This salt lost its market down country owing to large importations of Kokan which was superior and cheaper. Its sales were also affected by works in Oudh. Moreover, the Nuh works were not on the railway ; so the output gradually fell. About 1880-81 the output began to fall steadily and the works were in a moribund state. In 1883-84 the stock of salt, over 5 lakh maunds, was purchased from the manufacturers at 1½ annas a maund, but of this quantity 18,971 maunds only were disposed of by public auction and the rest had to be destroyed as unsaleable. The licence to manufacture salt was withdrawn and the works were finally closed.

(*b*) MANUFACTURE.

(i) *Old system.*

The works consisted of natural springs very strongly saturated with salt. The brine was got from wells with the help of bullocks. Salt was obtained by the evaporation by solar heat in large masonry evaporation pans. The salt produced was of fair quality. The manufacturers were given licences. The works were supervised and the factories guarded to ensure that no salt was made without a licence. The permission of the officer in charge of a cluster of works had to be obtained to extract and store salt. It was not given, unless the salt was of saleable quality.

The salt was extracted and stored under supervision of petty officers. It was estimated in baskets of known capacity and stacked in heaps. The heaps could only be opened in the presence of the officer in charge. Pits were also dug for storage in the vicinity of the pans of the salt factory. The pits were rectangular and of measured dimensions. The salt stored in the pits was covered with a layer of earth.

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(ii) *Recent system.*

The old salt works were closed in 1922-23 and the old salt pans, etc., had practically disappeared when licence was granted to reopen the works in 1932. The pans had to be constructed afresh. The brine was derived from wells and evaporated by solar heat in shallow masonry pans varying in size from 200′ × 120′ to 80′ × 40′ and from 6″ to 12″ in depth. Each well had a set of pans about ten in number, the levels of which were arranged to allow the natural flow of brine from the first to the last. The first pan nearest to the well was filled with brine which was allowed to stand for a few days depending on the season and weather. The brine was then run off to the second and then to the third and so on till it reached the last pan but one—the condenser. When salt began to form there, the brine was at once run off to the last pan—the crystallizer, for a crop of salt. In winter, the evaporation being slow, the process took about 6 weeks from the date the brine was drawn, but in summer 8 to 10 days sufficed. The Sultanpur salt was white, opaque, small in grain and contained sodium sulphate and magnesium chloride as impurities.

(*c*) OUTPUT AND ISSUES.

The following table gives the output and issues of the works for some typical years :—

Years.	Output in maunds.	Sales in maunds.
1867-68	5,76,908	7,20,934
1869-70	6,65,509	6,14,039
1870-71	7,16,697	6,79,409
1875-76	6,38,844	6,19,645
1880-81	5,68,205	5,81,097
1884-85	4,61,834	5,52,404
1889-90	2,66,980	3,29,641
1890-91	1,90,485	2,36,858
1895-96	1,19,392	1,08,133
1899-1900	89,571	78,180
1904-05	78,670	78,819
1909-10	26,945	30,316
1915-16	39,517	37,854
1920-21	42,129	55,999
1923-24	Works closed.	
1932-33 (works re-opened)	23,208	20,568
1933-34	8,010	7,871
1934-35	6,003	7,290 works closed.

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The above are tell-tale figures. In 1869-70 there were 240 wells and 3,850 pans and the output was over 6 lakhs. About 1880-81 the Sultanpur salt began to feel the competition of cheaper Sambhar salt and the works gradually declined.

(*d*) CAUSES OF DECLINE.

1. The produce was inferior to that of Sambhar ; it was somewhat bitter in taste owing to the presence of impurities.

2. The manufacturers were heavily in debt ; the initial density of brine was low (3°B) ; salt was manufactured in shallow masonry pans which were expensive to construct and repair. The result was that the cost of production was very high. Before the Rajputana and Punjab sources were opened by Railway, this salt produced close to the populous districts of the North-Western Provinces and the Punjab had a great sale. The Sambhar lake was, however, connected by the Rajputana Malwa Railway with Agra and Delhi in 1875 and in 1876 the Through Traffic system was introduced there. So Sultanpur salt could not maintain its hold on the markets hitherto fed by it, which were captured by Sambhar and Khewra salts.

3. Even when an opportunity offered itself due to shortage of Sambhar salt or its higher price, the Sultanpur manufacturers did not take advantage of it. They raised the price and so gradually the market slipped out of their hands. The manufacture was too expensive to be remunerative at low prices. The result was that the output which at one time even reached about 8 lakhs gradually declined. These works had the advantage of being on the railway and were nearer to the Oudh markets by 170 miles than Sambhar. Even then the salt could not stand in competition as it was too expensive to make ; only one group of factories remained struggling till 1923-24 when the works were closed. They were re-opened in 1931-32. The output during 1932-33 was 23,208 maunds, but it fell to 8,010 maunds in 1933-34. The Department gave special concessions and all possible help to the licensees, but the works proved a failure and so the licence was cancelled and the works closed in April 1935. This salt could not compete with cheaper and better quality Sambhar salt.

(*e*) DISTRIBUTION, PRICES, ETC.

The Sultanpur salt works were at zenith from about 1865 to 1885. The salt was consumed (1) in the adjoining districts of the Punjab, (2) in Rohilkhund and Kumaun districts and in hilly places near Kumaun, (3) in Dehru Dun district, (4) in Oudh, Partab Garh, Phillibhit, Fyzabad districts. The market north of Delhi was gradually lost. The salt during 1932-33, 1933-34 and 1934-35 was sent to Saharanpur, Muzaffarnagar, Delhi, Sonepat and Rohtak, etc., or was consumed in areas around the works. The selling price during 1933-34 varied from Re. 0-3-6 to Re. 0-7-0 a maund and the average price realised was Re. 0-5-6 per maund. The salt sold at Rs. 2-4-0 a maund in the Delhi and Muzaffarnagar markets.

(*f*) HISTORY OF ADMINISTRATION.

The establishment first posted to the works in 1859 after they came under Government control in 1858 consisted of a European Superintendent and his staff of Assistant Patrols, Maharrirs, Kotegusht and peons. The work of the staff in those days was mostly preventive ; they

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had very little to do with manufacture. About 1879 the Sultanpur and Nuh works were brought under closer supervision and duty on salt manufactured was levied before the salt was cleared. The establishment remained more or less the same. There was a separate Inspector at Zahidpur works. In 1900, the strength was one Superintendent, 2 Inspectors, one vernacular clerk, 6 Jamadars and 46 peons. This continued with more or less minor changes till the works were closed in 1923-24. On re-opening of the works in 1931-32, a Deputy Superintendent was put in charge. He had a Jemadar and 6 peons to assist him. He worked under the Assistant Commissioner of the Internal Branch, Northern India Salt Revenue Department. After the closure of the works the establishment was withdrawn, but to prevent illicit manufacture a Jemadar and one peon were allowed to remain there.

CHAPTER X.

Saltpetre and Allied Industries.

Saltpetre and salt are very intimately connected and saltpetre has had such a tremendous influence on the salt policy of the Government that it appears to be necessary that a chapter should be devoted to the saltpetre industry, its history and development in India. Before passing on to its history, it will not be out of place to notice a few common properties and uses of saltpetre.

(*a*) PROPERTIES AND USES OF SALTPETRE.

Properties. Saltpetre, nitre and potassium nitrate, called "Kalmi Shora" are all one and the same substance. This salt is formed by the combination of nitric acid with the base potassium. Its solubility greatly increases with heat. Hundred parts of water at ordinary temperature dissolve 30 parts of nitre, but at boiling point they dissolve about 200 parts. Thus if 200 parts of saltpetre and 37 parts of salt are dissolved in 100 parts of boiling water and allowed to cool, 170 parts of saltpetre and one part of salt will crystallize out leaving 30 parts of saltpetre and 36 parts of salt in the residual solution which is mother liquor "tor" or "Kahi" used by all refiners for the production of refined saltpetre and the separation of salt from crude saltpetre. Saltpetre has a peculiar saline bitter taste. Its specific gravity is 1.93.

Formation.—Saltpetre forms both from potassium salts of marine origin and from the potash of granite or gneissic rocks. These rocks generally get decomposed by the action of wind, rain, rivers, etc., called "weathering" into a loose powdery soil. Potassium is then derived from this powder and is converted into saltpetre by nitrification—a process by which the atmospheric nitric acid and ammonia act on potassium salts and convert them into saltpetre. Ammonia is generally formed by the decomposition of all kinds of animal refuse and is always present in the air. Plants convert the potassium into potassium carbonate and on decay again give rise to saltpetre. Nitre cannot deposit at a lower temperature than 60°F. and so natural saltpetre deposits are confined to warm latitudes. Their presence is limited to places in which felspathic rocks or marine deposits afford a plentiful supply of potassium. Necessary conditions for the formation of saltpetre are (1) supply of nitrogenous organic matter, (2) climatic conditions favourable for converting urea and ammonia into nitrous and nitric acid, (3) the presence of potash, and (4) meteorological conditions suitable for the efflorescence of nitre at the surface. In provinces like Bihar and Orissa we have ideal conditions for the formation of saltpetre. The large quantities of animal and vegetable refuse gathered round the agricultural villages of Bihar are decomposed into ammonia and other nitrogenous substances. These are acted upon by certain kinds of bacteria (nitrifying bacteria) in the damp hot weather with the result that at first nitrous and then nitric acid is produced in the soil. This nitric acid readily acts upon the salts of potassium with which the soil of the villages is impregnated on account of the large quantities of wood and dung ashes constantly being heaped up by villagers around their habitations. The nitrate of potassium thus produced is dissolved by rain water and accumulated in the sub-soil from which the salt reascends to the surface by capillary attraction in the

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period of desiccation following the rainy weather. Large quantities of nitre are thus left as a saline efflorescence on the surface of the soil along with some other salts, such as sodium chloride or sodium carbonate.

Occurrence.—It is found widely spread in nature as a surface deposit mixed with earth and other salts. It is found over a great part of North-West Provinces and of Southern India, in China, Persia, Egypt, Spain, Chile and Peru. It is brought to the surface of the ground by moisture drawn to the surface by capillary attraction and is left there as an efflorescence on evaporation. It is seldom found pure and is generally mixed with other salts. In the United Provinces and Madras it is found mixed with common salt.

Uses.—The most important use to which nitre has been put for a long time is the manufacture of gun powder. It is also extensively used in the preparation of fireworks. For its antiseptic powers, it is used to preserve meat and fish. It is used for freezing mixtures. It has a sedative action on the heart and is useful for checking inflammations and is consequently uesd in medicine. It is also used as a flux in glass making and as a mordant especially in wool dyeing ; is used in association with certain animal dyes such as lac and cochineal. And lastly being a valuable fertilizer, it is used as manure especially for wheat and tobacco.

(*b*) HISTORICAL.

In India saltpetre has been known to exist for ages. Crude saltpetre was formed from saline earth or efflorescence occurring in the United Provinces, the Punjab, Bihar and Madras and its manufacture has been the hereditary occupation of a class of people called "Lunias" for centuries. Salt comes out as a by-product in the manufacture of saltpetre and so Government adopted a system of licences for its manufacture in order to protect salt revenue.

(*i*) *United Provinces.*

The Doab districts were ceded to the East India Company by the Nawab Wazir of Oudh in 1801. The Company created the salt monopoly and prohibited the manufacture of salt within the Customs Line. The manufacture of saltpetre remained unfettered for some time. Soon, however, the Company realized that the salt educed in the process of manufacture was a great danger to the salt revenue and so laid restrictions on saltpetre manufacture. The manufacture of alimentary earth salt in the North-West Provinces and in parts east of the Jumna was prohibited in 1834, but the Act had no power to control the production of salt in saltpetre works. However, the purification of this salt was declared an offence. By Act XXXVI of 1855 the purification and refinement of impure salt obtained in the manufacture of saltpetre so as to produce alimentary salt was declared to be manufacture of salt and was prohibited by law. The Customs and Revenue officials were empowered to search houses and enclosed places for contraband earth and saltpetre salt. Saltpetre salt which was not purified, however, could be sold without any restrictions and large quantities of this stuff passed into consumption. Saltpetre factories were established in the localities where salt percentage was excessive ; the Lunia whose salt works had been suppressed made salt under guise of saltpetre. This was a menace to the salt revenue and so by Act XXXVI of 1861 the saltpetre industry was brought under closer

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control. The manufacture and refinement of saltpetre was only permitted under licences which were issued on payment of fees. The separation of salt by crude saltpetre workers was prohibited and salt educed by refiners was made liable to full duty in force. The manufacture of *khari, rassi* and *sajji* without a licence was also prohibited. A Deputy Commissioner and Circle Inspectors (officers of the Inland Customs Department), were charged with the duty of supervising crude saltpetre works, refineries, rassi and sajji factories and the Internal Branch was constituted. Saltpetre salt was excised and saltpetre factories were supervised. In the United Provinces of Agra and Oudh alone there were 17 circles with as many officers and 1,260 subordinate officials and men all employed on preventive duty. The provisions of the Act were incorporated in the Indian Salt Act of 1882. From 1861 to 1885 in the North-West Provinces and Oudh and Bihar, on a saltpetre refinery being opened, a Government official called 'Mushriff' was appointed. He watched and recorded all refinery operations. He was then dispensed with and licensees were made responsible for everything. The Internal Branch was re-organized in 1923-24 and again in 1929-1931, *i.e.*, radical changes were made in the licensing system, which will be described later on.

(*ii*) *Bengal and Bihar.*

In olden days there were no restrictions on the manufacture of saltpetre which went on extensively in Bihar. The Act of 1861 was extended to Bihar in 1873. The Government of Bengal, however, did not accept the agency of the Inland Customs Department in order to enforce the provisions of the Act, but appointed their own establishment under District Officers. This arrangement was not found satisfactory and so in 1880 the jurisdiction of the Internal Branch was extended to Bihar. In 1889-90 Mr. Ashton of the N. I. Salt Revenue Department was deputed to report on the saltpetre industry of Bengal and Bihar and it was found necessary to have a greater control over manufacture and refinement of saltpetre. Hence in 1890 the saltpetre refineries of the Bhagalpur Division of Bihar and those around Calcutta were brought under the N. I. Salt Revenue Department. The Calcutta refiners were deprived of the profits on salt which they made by selling salt educed in the manufacture of saltpetre and so gradually gave up the work and the industry declined. The control of the saltpetre refineries in Calcutta and its environs was transferred from the N. I. Salt Revenue Department to the Bengal Government in 1901 as Bengal had its own Salt Department. In 1925-26 there were only two refineries which produced 1,356 maunds of saltpetre. In 1932-33 there was only one refinery and that too in a moribund state. Only 13 maunds of refined saltpetre were produced in 1932-33. No licence was issued in 1933-34 or 1934-35.

As regards Bihar, the control of the saltpetre industry remained under the N. I. Salt Revenue Department. At one time the industry in Bihar was very flourishing. In 1892-93, 38,497 licences were issued for saltpetre works in Bihar. In 1923-24 the number fell to 17,416 and in 1930-31 to 3,372. The depression in Bihar is thus most noticeable. At present there are about a hundred refineries there.

(*iii*) *Punjab and Rajputana.*

About 1870 when the Inland Customs Department was at its zenith, the Salt Revenue of the Punjab was under the Punjab Government. The

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manufacture of earth salt in the trans-Indus portions of the Punjab was prohibited in 1881. In the Rajanpur Sub-Division of Dera Ghazi Khan district, earth salt was manufactured on a considerable scale under a contract system. In 1889-90 at the request of the Punjab Government, Mr. Buckley, Superintendent, Northern India Salt Revenue, was deputed to report on the saltpetre industry in the Punjab. According to him 1,48,000 maunds of crude saltpetre and 56,000 maunds of refined saltpetre were annually produced in the Punjab and on his recommendation the jurisdiction of the Internal Branch was extended to the Punjab. The Department undertook the supervision of saltpetre manufacture and the suppression of manufacture of earth salt especially in the Rajanpur Sub-Division, where illicit manufacture was much prevalent. The supervision was not so close as in the U. P. and Bihar since the eduction of salt in saltpetre factories was not so frequently resorted to. In 1890-91 the jurisdiction was further extended to Ajmere, Marwara in Rajputana where the location of a small establishment for the prevention of earth salt manufacture was found necessary.

When the abolition of the Inland Customs Line was under contemplation, treaties were negotiated with most of the rulers of the native states. The terms of the treaties, among other things, provided for the suppression of scattered earth salt manufacture and for a check over saltpetre works, especially those which were capable of producing very large quantities of salt.

(*iv*) *Madras.*

The saltpetre industry in Madras is as old as in Northern India. For years the manufacture of saltpetre was free from restraint or regulations. In the course of this manufacture edible salt was produced as a by-product and was consumed by the poorer classes. The Madras Salt Commission of 1876 examined the question and came to the conclusion that unregulated manufacture of saltpetre was inimical to salt revenue, as some works outwardly meant for saltpetre manufactured salt. It was with the passing of the Indian Salt Act, 1882, that the saltpetre industry was brought under control. A system of licence was introduced and persons guilty of illicit manufacture were liable to punishment. The licence fees for crude works and refineries were Rs. 2 and Rs. 3 respectively. About 1910 there were over a thousand crude works and refineries mostly in the Madura, Trichinopoly and Coimbatore districts, and 12,000 maunds of refined saltpetre were annually produced. An Amin (departmental petty officer) supervised each refinery. The industry, however, gradually declined and in 1924 the system of security bonds combined with supervision by the staff of the preventive circles was introduced and the special staff was abolished. From January 1927 the Northern India system was adopted under which a single licence was issued for the manufacture of both crude and refined saltpetre and the licensee was free to dispose of the educed salt as he liked. The licences since then are granted for the calendar year. A consolidated fee of Rs. 15 per factory or work is levied to cover the duty on the salt that may be educed during the extraction of saltpetre. The number of factories licensed for the manufacture of crude and refined saltpetre was 50 in 1931, but it fell to 40 in 1932 and to 37 in 1933. As a result of the Delhi Pact manufacture of crude saltpetre and small-scale manufacture of salt is now free, and the refineries alone are under supervision. The industry is in a very depressed state.

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(*v*) *Bombay.*

There are no saltpetre works in Bombay or Sind.

(*vi*) *Burma.*

There are no saltpetre works in Burma. Deposits of potassium nitrate are known to exist, particularly in the Meiktila district, but are not worked.

(*c*) INTERNAL BRANCH—DUTIES AND FUNCTIONS.

The Northern India Salt Revenue Department through its Internal Branch and North-West Preventive Divisions controls the saltpetre industry in the North-West Frontier Province, the Punjab, United Provinces and Bihar. The duties of the officers of these Divisions include the prevention of illicit manufacture of earth salt, supervision of eduction and disposal of salt and supervision of all licensed works in order to prevent the breaches of law relating to the conditions of the licence and the arrest and prosecution of persons contravening the provisions of the Salt Act. Since 1880 the area under the jurisdiction of the Internal Branch has been over 1,16,000 square miles extending over four provinces.

Prior to the Delhi Pact, crude saltpetre factories were inspected by the officers of the Internal Branch. Care was taken to see that no refined saltpetre or salt was produced and a saltpetre refinery did not work in the guise of a crude factory. In 1924 the crude saltpetre manufacturers were permitted to make refined saltpetre on payment of a higher licence fee. Licences for crude saltpetre, rassi and sajji, have, however, been abolished since the Delhi Pact (1931). The crude works are visited to see that privileges granted under the 'Pact' are not abused and that refinement of saltpetre is not carried on without a refinery licence. The saltpetre refineries are closely supervised. Refiners are expected to keep registers where all operations carried on from day to day are entered. The salt educed has to be kept in a bonded store house and regular accounts maintained. From 1924 to 1928, however, the refiner was free to dispose of his salt as he liked, since he paid a consolidated licence fee, otherwise such salt has always been liable to duty.

Different practical tests are carried out by the officers of the Internal Branch to ascertain the quantity of salt and refined saltpetre in a given quantity of crude saltpetre. It will be out of place to give them in detail. Prior to 1931 certain localities, where the percentage of salt in salt earth was excessive, were proscribed and no licences were issued for the manufacture of saltpetre, khari, rassi or sajji in these localities.

(*d*) MANUFACTURE OF CRUDE AND REFINED SALTPETRE.

The manufacture of crude saltpetre begins in the United Provinces in January and in Bihar in February. If the weather remains favourable, the works increase with warmer weather when the soil becomes richer. The work reaches its zenith during May and June. In the United Provinces and Bihar mostly artificial heat is used, but in the Punjab where rainfall is low, solar heat. The manufacturers begin their operations by scraping the surface from old mud heaps, mud walls, the lanes and walls of villages and towns, and from waste places where the saltpetre appears in the form of a thin white efflorescence. The material so obtained is filtered in large clay-lined mud filters provided with a bottom of bamboos, resting on bricks and leaving a space below for brine. Over bamboos a grass mat is laid and over the mat a thin layer of vegetable ash upon which the earth to be filtered is spread. Water is poured gently, which passing through the earth dissolves the saline matter and is carried to a receiver. This brine from the receiver is placed in a boiler and heated. It is then removed to earthen vats in which a sediment settles. The clear brine is then put back in the boiler and boiled ; while boiling, salt deposits at the bottom of the boiler and is removed. When the crystallizing point is reached, the liquid is poured into earthen vats and is allowed to remain till the sediment is deposited. The liquid is then finally transferred to crystallizing vats where saltpetre crystallizes out in a refined state in about 24 hours. After extraction from the vats the saltpetre is washed to free it from the mother liquor called ' Tor ' and it then becomes perfectly white. This saltpetre is called ' kuthia '. Refined saltpetre can also be made from crude saltpetre by dissolving it in water or strong brine and removing impurities by sedimentation. Salt also can be obtained by boiling down the mother liquor which remains in the vats after the crystals of saltpetre have been removed.

If a saltpetre manufacturer does not wish to refine his saltpetre, he simply boils the brine produced from filter to a crystallizing point. When this point is reached, he pours the liquid into the crystallizing vats where crude saltpetre is formed. Before the crystallizing point is reached, sitta or impure salt deposits. In the Punjab, where rains are not so heavy, the brine is not boiled, but is passed into shallow pans and evaporated by solar heat.

The manufacture of saltpetre essentially varies with the salts with which it is combined. In Southern India, the first stage is the manufacture of common salt from salt earth and the second stage is the manufacture of saltpetre. The crystallization of common salt is continued, until the needle crystals of saltpetre appear. The mother liquor is then run off and recrystallized for saltpetre. Cold assists the saltpetre formation and so saltpetre easily crystallizes out at night.

(*e*) SUPERVISION OF KHARI, RASSI AND SAJJI FACTORIES.

Prior to 1931, factories on which khari or sulphate of soda was manufactured by solar heat were closely supervised, since salt could be easily educed in the process of manufacture. Khari is prepared by a process very similar to that by which crude saltpetre is produced. The quality of earth collected is, of course, different in each case, but the filters, boilers and pans employed are much the same. For evaporation and condensation of the brine, boilers and pans are both used, the former in Bihar and the latter in the United Provinces, since in the United Provinces there is a longer dry weather and in Bihar the soil contains only a small percentage of salt. Patna khari, the commercial name of Bihar khari, is produced by lixiviation of soda sulph efflorescence and its evaporation by artificial heat in iron boilers. It is used chiefly for preserving hides and skins, as a manure for potato and paddy crops and also as a cathartic for cattle. Bihar khari contains very little sodium chloride, but the khari produced up-country by solar evaporation contains a considerable percentage of it.

The rassi and sajji factories too were licensed prior to 1931. The manufacture of salt as a by-product is not possible in these factories, but the factories are similar to that of khari and hence the need for close supervision. If they were not licensed, a man could start manufacturing khari and educing salt under guise of manufacturing rassi. Sajji is also manufactured by artificial heat in boilers formed of earthen slabs from the lixiviation of soda-carbonate efflorescence. Rassi and sajji are greyish in colour and have soapy touch. They are used by dyers and soap makers and also by tobacconists.

(*f*) DEVELOPMENT AND ULTIMATE DECLINE.

The saltpetre industry flourished in India up to 1917-18. It began to decline rapidly after the Armistice in 1918. The rise and decline of this industry forms an interesting study. It is carried on by two classes of people (1) The village Lunia whose occupation it has been from time immemorial and (2) the refiner who refines the crude saltpetre produced by the Lunia. The refiner pays a big fee and prepares refined saltpetre within high walled enclosures and the salt educed by him is not allowed to leave the premises until it has been excised.

The table below will show the figures of total licences issued for all saline substances, the quantity of crude saltpetre dissolved and that of refined saltpetre produced and exported from Calcutta in some typical years. Figures from 1924 to 1928 when there were no restrictions on manufacture are not available.

Northern India.

(*a*) Year.	Number of licences.	Crude saltpetre dissolved.	Refined saltpetre produced.	Exports of saltpetre.
		Mds.	Mds.	Mds.
1877-78	9,152	1,97,951	1,08,617	5,29,474
1890-91	47,521	11,38,474	7,75,438	5,49,399
1900-1901	49,165	8,61,533	4,79,651	4,67,214
1909-10	48,266	8,58,150	4,80,150	4,85,447
1915-16	51,805	13,33,524	6,08,524	4,92,887
1920-21	47,071	11,31,674	4,46,883	17,191
1923-24	37,481	5,84,426	2,07,761	7,721
1929-30	20,034	3,90,444	1,41,179	Tons. 4,228
1930-31	15,671	5,04,197	1,84,358	3,963
1931-32	3,907	5,10,628	1,94,272	6,609
1932-33	180	6,13,229	2,17,990	7,870
1933-34	192	9,14,346	2,59,600	9,360
1934-35	193	9,14,697	2,55,121	8,862

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The following table gives the number of individual licences issued in some typical years from 1880 to 1933 :—

(b) Year.	Refineries.	Crude salt-petre.	Khari.	Rassi.	Sajji.
1880-81	572	28,617	11,444	400	1,012
1890-91	526	42,540	3,931	166	358
1900-1901	455	39,771	7,800	239	900
1909-10	338	34,585	12,390	397	556
1920-21	397	34,715	5,620	14	325
1925-26	..	13,296	12,633	95	319
1930-31	154	6,571	8,678	32	390
1931-32	148	..	1,846	1	298
1932-33	180	..	..	..	..
1933-34	192	..	..	..	..
1934-35	193	..	..	..	..

This shows that the industry is declining. With the removal of restrictions on manufacture of khari, rassi and sajji, the figures of a later date than 1931-32 are not available.

Madras.

Year.	Crude saltpetre factories.	Refineries.	Refined saltpetre produced.
			Mds.
1892-93	1,815	40	16,126
1911-12	1,074	34	12,000
1915-16	885	26	6,590
1920-21	621	21	4,765
1921-22	625	28	3,691
1922-23	551	22	3,881
1923-24	369	31	3,756
1924-25	304	14	3,056
1925-26	123	7	2,411
1927 (Calendar year)	81 (Combined licences).	..	913
1928 do.	72 do.		1,220
1929 do.	54 do.		596
1930 do.	50 do.		585
1931 do.	50 do.		No information.
1932 do.	40 do.		Do.
1933 do.	37 do.		Do.

For long the trade was carried on as a monopoly by the East India Company. For over a century the Company were under obligation to supply to the British Government saltpetre to the extent of 500 tons annually, before being allowed to offer any for public sale. The trade in saltpetre has always been subject to extreme fluctuations. Up to 1860 India enjoyed a monopoly in the saltpetre trade. The exports in 1859 were 35,000 tons or about 10 lakhs of maunds. The Indian industry solely depended on foreign markets. The chief customers were the United States of America, the United Kingdom, China and Mauritius. After 1860 the manufacture of saltpetre from nitrate deposits of America and German potash began to affect exports from India which started declining. In 1867-68 India exported 4,49,147 maunds of refined saltpetre valued at £2,56,301. The average quantity exported from 1878 to 1883 was 4,05,568 cwts. a year. From 1897 to 1903 the average annual exports amounted to 3,82,353 cwts. valued at £2,62,592. On an average India exported 5 to 6 lakhs of maunds annually up to 1914, when war broke out and there was a great demand for saltpetre from Great Britain and America for ammunition purposes. Moreover, potash was not available for Strassfurt mines of Germany and so India became the chief market and refiners expanded their works. The Government of India provided new facilities in 1915-16 by reducing the licence fees, opening the proscribed localities and introducing the system of issue of licences through the post offices—a system which ultimately became very popular. The exports in 1916-17 rose to 26,400 tons or about 8 lakhs of maunds valued at £7,03,690. The Armistice in 1918, however, suddenly stopped all demand for saltpetre and after the boom the great slum set in.

Besides this the market was captured by cheaper natural products and the development of nitrates by scientific processes started. Moreover, during and after the War, there was a sudden rise in the price of plant and in railway freight. Also the local product used for manurial purposes began to be replaced by Chile nitrate and imported chemical manures which sold at a cheaper rate. The avarice of the landlords in regard to the rent of nitrous soils and the tyranny of the middleman also accounted for the decline of the industry. All these causes combined to bring the industry to a state of acute depression and brought about a serious fall in exports. It will be seen from the above figures that in 1934-35 only 8,862 tons of nitre were exported from both Calcutta and Karachi.

(*g*) Revival Measures—Scott O'Connor Scheme.

The Internal Branch was reorganized in 1924, the reorganization scheme being formulated by Mr. Scott O'Connor, Deputy Commissioner, Northern India Salt Revenue, with the object of assisting the decaying saltpetre industry by the removal of restrictions which hampered its activities. The change was brought into effect from 1st August 1924.

Before the introduction of this scheme, the manufacturer of crude saltpetre was prevented absolutely by the terms of his licence from educing any salt whatsoever. The refiners purchased the crude article and were required either to destroy or to have excised by officers of the Department, all the salt which in the process of refinement accumulated in their factories. Under the revised system a licence to manufacture saltpetre was granted without any distinction between crude and refined product and any person in possession of such a licence was allowed to carry his process as far as he chose and educe without hindrance and dispose as he pleased of as much salt as he could. This was done to help the ' Lunia ', the manufacturer of crude saltpetre. To cover the loss of revenue on salt formerly excised from refineries, the scale of fees were enhanced in Bihar from four annas to Rs. two and elsewhere from Rs. two to sums varying from Rs. ten to Rs. fifty according to the salinity of the soil in various districts and the method of manufacture employed. The fee was payable per factory and the area of filters, boilers or pans constituting a single factory was prescribed separately for the two systems of manufacture by solar and artificial heat. The manufacture of khari, rassi and sajji was similarly licensed, the licence fee for rassi and sajji being fixed at Rs. 2 and for khari Rs. 2 in case of manufacture by artificial heat and Rs. 10 in case of works working with solar heat.

The Scott O'Connor scheme resulted in a reduction of the Internal Branch establishment, but failed in its primary object which was to benefit the lunia and to revive the decaying saltpetre industry. The lunia took no advantage of the facilities offered. He was too slow and worked on too small a scale either to find buyers himself or to co-operate with others to get buyers for any refined saltpetre he might produce and was thus driven back to the refiner to whom he sold his crude product. The refiner continued to gain, since some share of his fees, as it were, was transferred to the poor ' lunia '. The decrease in demand also crippled the industry.

(*h*) 1928-29 REVISED SCHEME.

The Scott O'Connor scheme proved inequitable and oppressive to the poor 'lunia ' as explained above and it was accordingly decided to revert to the old system, and place the burden on the proper shoulders. So a revised scheme approaching the system in force prior to the Scott O'Connor scheme and having as its main features low rates of licence fees for crude saltpetre, khari, rassi and sajji works, with higher rates of licence fees for saltpetre refineries and the excising of salt educed therein, was sanctioned by the Government of India. The scheme provided for the issue of licences through the post office and was put into force from 1st August 1929. According to this system, a distinction was once again drawn between the refiners and the crude saltpetre manufacturers. The former were subject to a high fee and payment of duty on such salt as they might produce and the latter were given licences on nominal rates of fees. Moreover, the Rs. 2 licence under which a lunia could educe salt and dispose of it as he pleased was also kept as a special feature of the altered scheme. However, very little advantage was taken of this provision by the lunia who was precluded by high railway freights, his lack of capital and of business training from access to more distant markets and was entirely dependent on the refiner. This system remained in force for about three years only.

(*i*) DELHI PACT, 1931.

Under this agreement villagers were permitted to manufacture salt for their domestic consumption. So it was essential that the control exercised over the manufacture of crude saltpetre should be removed, since if salt could be manufactured without licence, it would have been unreasonable to demand licences in case of the less important substances like crude saltpetre, khari or rassi which would never have needed control but for the possibility of educing salt as a by-product of their manufacture. Accordingly the licensing system in respect of these substances was abolished from the 15th September 1931. Since then saltpetre refineries alone have to work under licence.

(*j*) PRESENT STATE.

(*i*) *Northern India.*

The rise and ultimate decline of the saltpetre industry has already been traced. As mentioned above, the licences for crude saltpetre, rassi and sajji have been abolished since the 15th September 1931. The refinement of saltpetre, cannot, however, be resorted to without a refinery licence, and refineries are under close supervision. The lunia is free to manufacture crude saltpetre but he is still entirely dependent on the refiner. He is not finding his avocation profitable and so is gradually abandoning it and devoting himself to agriculture or manual labour. Some of the lunias, however, are carrying on the manufacture of salt under the Pact in some of the saline areas in the United Provinces. The Bihar saltpetre is very inferior and recently the lunia found khari manufacture more profitable and took to that instead of saltpetre.

In the Punjab and the United Provinces the fee for a licence to manufacture and refine saltpetre and educe salt therefrom is Rs. 50 and in Bihar Rs. 20. The duty is levied on salt and sitta (impure salt containing not more than 60 per cent. sodium chloride) removed from saltpetre refineries in the Provinces of the Punjab, Bihar and United Provinces at the rate of Re. 0-10-0 and Re. 0-1-3 per maund respectively including surcharge of 25 per cent. During 1935-36 there were 31 refineries in the Punjab, 59 in the United Provinces and 117 in Bihar. About eight or nine thousand tons (2,40,000 maunds) of refined saltpetre are annually exported from Calcutta and Karachi both. About 80-90 thousand maunds of salt are produced and excised. The industry is in a depressed state and there is no hope of its revival.

(*ii*) *Madras.*

The Industry in Madras is also in a state of acute depression. At present there are about 37 refineries producing about 400-500 maunds of saltpetre annually and about the same quantity of educed salt. The percentage of sodium chloride in educed salt is found to range from 82 to 93 per cent. and the major quantity of the salt is reported to pass into human consumption, the balance being used for tanning and private fish curing. The salt issued for human consumption is subjected to a cleaning process, before it is offered for sale and it is ascertained from enquiries that it has had no harmful effect on the consumers. The saltpetre industry is gradually declining owing to the very low margin of profit left to the Uppiliar or manufacturer after paying the licence fee and defraying other working expenses. Foreign saltpetre which is imported by sea and land now sells at a much lower price, Rs. 65 to Rs. 75 per candy against Rs. 75 to Rs. 85 per candy for the local product and is preferred by the dealers as being more suitable for fire-works and blasting purposes on account of its dryness. Even in spite of a reduction in the wholesale price of the local product, the industry continued to decline year after year. The question

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of reviving the industry by reverting to the old system of levying two different licence fees for crude saltpetre factories and refineries and controlling the issue of educed salt for consumption was examined in 1931 and it was decided that the expenditure on account of the establishment required to supervise the working of the refineries was prohibitive. The industry forms only a part-time occupation for poor people of the Uppiliar class who sell the crude saltpetre manufactured by them to the refineries for ultimate disposal.

(*k*) OUTPUT OF SALT.

The output of salt from saltpetre refineries in Northern India is shown in the table below in lakhs of maunds :—

Year.	Punjab.	United Pro-vinces.	Bihar and Orissa.	Bengal.	Total.
1905-06	..	·37	·16	..	·53
1906-07	..	·49	·20	..	·69
1907-08	..	·49	·18	..	·67
1908-09	..	·47	·24	..	·71
1909-10	..	·40	·21	..	·61
1910-11	..	·45	·21	..	·66
1911-12	..	·41	·20	..	·61
1912-13	..	·53	·18	..	·71
1913-14	..	·66	·17	..	·83
1914-15	..	·52	·20	..	·72
1915-16	..	·69	·21	..	·90
1916-17	..	·85	·27	·13	1·25
1917-18	..	·60	·37	·23	1·20
1918-19	..	·80	·29	·03	1·12
1919-20	..	·52	·27	·05	·84
1920-21	·02	·32	*·01 ·23	..	·58
1921-22	·03	·30	·19	..	·52
1922-23	·01	·28	·14	..	·43
1923-24	·08	·26	·01 ·07	..	·42
1929-30	·04	·18	·01	..	·23
1930-31	·15	·28	·02	..	·45
1931-32	·42	·25	·02	..	·69

* Central Provinces.

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Year.	Punjab.	United Provinces.	Bihar and Orissa.	Bengal.	Total.
1932-33	·56	·31	·05	..	·92
1933-34	·59	·24	·05	..	0·88
1934-35	·61	·28	·07	..	0·96

No figures are available for 1924-25 to 1928-29 during which period there were no restrictions on manufacture.

(*l*) HISTORY OF ADMINISTRATION.

It has been seen in the "Historical" section of this Chapter how the saltpetre industry in the United Provinces was brought under control in 1861, how the Internal Branch was constituted and how its jurisdiction was extended to Bengal, Bihar and the Punjab. The Internal Branch forms one of the four Divisions of the Northern India Salt Revenue Department under an Assistant Commissioner. Prior to the Scott O'Connor Scheme there were two Assistant Commissioner's Divisions comprising 9 circles, each under a Superintendent, and the saltpetre industry was under very strict control. With the introduction of the Scott O'Connor Scheme in 1924-25, a single Division under an Assistant Commissioner was created with only five circles. Superintendents were in charge of three of these and were stationed at Agra, Rai Bareli and Muzaffarpur. Inspectors were in charge of the other two circles, *viz.*, Punjab and Rajanpur. The relaxation of control in 1931 led to some reshuffling of territorial charges and the reduction of one Superintendent and 4 Inspectors. At present the Division is under an Assistant Commissioner with his headquarters at Agra. There are two Superintendents stationed at Allahabad and Cawnpore under him. The subordinate establishment consists of Inspectors, Jamadars, peons, etc. The Assistant Commissioner, Superintendents and Inspectors pay visits to the licensed works. They visit and examine large saline tracts, unlicensed crude, khari, rassi and sajji works in order to see that privileges granted under the Delhi Pact are not abused and that refinement of saltpetre is not carried on without a refinery licence. They also inspect the factories etc., of concessionaires-firms who are allowed rebate of duty on salt used for industrial purposes.

Up to 1st April 1935 the jurisdiction of the Internal Branch extended to the North-West Frontier Province, the Punjab, the United Provinces and Bihar. From 1st April 1935 the North-West Frontier Province and 19 districts of the Punjab have been transferred to the control of officers of the North-West Preventive Division, Kohat. A list of the districts transferred has already been given in the chapter on Kohat Salt mines under "History of administration". The remaining districts of the Punjab, *viz.*, Gurgaon, Delhi, Rohtak, Karnal, Ambala, Ludhiana, Jullundur, Hissar and Hoshiarpur, the United Provinces of Agra and Oudh, the Central Provinces, Central India and Bihar constitute the Internal Branch and are under the Assistant Commissioner, Agra.

CHAPTER XI.

Madras Salt Sources.

(*a*) HISTORICAL.

Salt manufacture has been going on in Madras from times immemorial—Madras has a very big coast line and the manufacture of marine salt was carried on along the coast line from Ganjam to Cape Comorin. Salt was also manufactured on the Malabar coast, but as the climate, soil and brine were unsuitable and salt produced was inferior, its manufacture was given up about 1824. In some Districts such as Tanjore, Masulipatam and Nellore, salt was produced from marshy swamps. This spontaneous salt was collected and used by the people. In addition to marine and swamp salts, earth salt of fairly good quality was manufactured in Bellary and Kurnool Districts. The East India Company assumed the monopoly of salt manufacture about 1805. A detailed account is given in the " History of Salt Revenue " Chapter. Mr. Plowden in 1856 and the Madras Salt Commission in 1876 both recommended Excise—the system of manufacture and sale by private individuals on payment of duty—in place of Government monopoly. This was gradually adopted. The present policy is to close the monopoly factories where they cannot be economically worked and are not definitely needed. Nowadays there are only a few monopoly factories which produce only about 1 per cent. of the total annual output.

(*b*) SYSTEM OF MANUFACTURE.

Salt is manufactured in Madras under three distinct systems :—

(*i*) *Monopoly system.*

The licensed manufacturer is bound to sell to Government at the price notified for the particular factory the whole of a fixed output. The Kudivaram rates are fixed with reference to the cost of manufacture. The quantity to be manufactured and purchased is notified beforehand and is locally known as the ' Dittam '.

(*ii*) *Excise system.*

Under this system the licensees are allowed to manufacture as much salt as they like. They sell to the public direct and pay duty and cess to Government before salt is removed from the factory storage platforms. Government has a staff on the factory to collect duty on the salt which leaves the factory and to exercise a certain amount of control over the processes of manufacture in order to ensure a reasonable standard of chemical purity in the salt manufactured. The licensee is bound by the conditions of his licence. He is responsible for the maintenance of channels, reservoirs, drying grounds, platforms, embankments, etc., in good repair. The infringement of the conditions of licence which are very comprehensive may result in its cancellation.

(*iii*) *Modified Excise System.*

Under the modified excise system the licensee ordinarily manufactures for his own sale, but may be required at any time before the commencement of the season to sell the whole or a portion of his salt to Government at a fixed price.

When the old monoply factories were numerous, Government owned at these various centres of production a stock of salt which could be placed on the market. The sale of this Government salt had the effect of keeping down the general price of salt to a reasonably low level. Among a number of competing licensees, however, it was found to be unnecessary under normal circumstances to put Government salt on the market in order to control prices. Government stocks began consequently to accumulate and after a number of years to deteriorate. The salt bought from licensees under the modified excise system is intended to take the place of the old monoply salt and to achieve the same object—the control of prices in the interests of the consumer. Since 1926 there has been a further modification of the system by which Government, instead of purchasing outright a quantity of salt from licensees at the beginning of the season which they might or migth not require to put on the market to control prices during the year, require the licensees under a new condition of their leases to reserve a certain quantity of their production for sale to Government if needed by Government at any time during the year. If it is not needed during the year, the salt becomes the property of the licensees again, who may be required to replace it by new heaps the following year.

(*c*) EXCISE FACTORIES.

(*i*) *Land Tenure.*

Many factories are old where the right to manufacture salt is hereditary and transferable, and the manufacturers own the pans themselves. In new factories or extensions of old factories Government is usually the owner of the land. Here the right to manufacture salt is put up to auction for a term of years, usually five. The successful bidder is the licensee to manufacture salt under the modified excise or monopoly system. The licence remains in force during the continuance of the lease.

Government waste land is also assigned to manufacture under conditions of licence. Waste land may also be given for digging of brine pits. Manufacture of salt has to be done in accordance with the conditions of the licence.

(*ii*) *Departmental Control.*

A system of excise necessarily involves a measure of freedom from control both in the process of manufacture and in the character and quality of the product. But still prior to 1927 the department insisted on the observance of certain rules connected with the manufacture of salt both in monopoly and excise factories to ensure the production of pure and clean salt for the consumer.

The important rules were :—

(1) That salt should not be scraped when the density of the brine in the pans exceeded 30°B.

(2) That salt should not be scraped in less than one inch of brine.

(3) That the bitterns should be eliminated after every third or fourth scraping.

(4) That salt should be scraped only in the mornings and evenings (to prevent deposit of magnesium salts).

From October 1927 all the four conditions were abolished in excise factories, while the first only was abolished and the other three retained in monopoly factories. Besides, in all factories formerly a fixed proportion of condensing and crystallizing area was insisted upon, but it is not the case now. Thus in excise factories all departmental supervision on the manufacture of salt has been abolished since October 1927. However, to prevent the abuse of the privileges thus accorded to the excise manufacturers and to insure the due performance by them of certain duties essential to the well-being of the public, and to the protection of the Government revenue certain conditions are inserted in the licences granted to the manufacturers. According to these conditions :—

(1) The licensee must commence and close manufacture within certain prescribed dates.

(2) The licensee must in any year in which notice shall have been given, manufacture salt with due diligence to the full capacity of his holdings.

(3) Certain regulations as to the method of manufacture must be obeyed.

(4) Salt which is inferior to the standard laid down from time to time for the factory cannot be stored and is liable to be destroyed.

(5) Salt must be stored under supervision and removed only by permission on payment of duty and cess.

(6) The licensee must pay such rent or assessment as the Collector may fix for the use of Government lands and buildings occupied by him.

(7) The licensee must declare in his application to remove salt the price at which it has been sold.

(8) The licensee must allow any officer of Government who is approved by the Collector of Salt Revenue to inspect his works.

(9) The licensee or his servants have access to the place of manufacture and storage only during specified hours. The infringement of any of these conditions may entail cancellation or suspension of the licence. These conditions together with the element of competition between the licensees ensure the production of a reasonably pure and clean article for the consuming public.

(*iii*) *Cess on excise licensees.*

Under section 43 of the Madras Salt Act, 1889, licensees in excise and modified excise factories were liable to pay annually to the Government so much of the charges for the establishment maintained at the factory for the protection and collection of Revenue as were in excess of 5 per cent. of the duty realised on the salt sold in the factory in the preceding year. This is the cess payable by licensees to Government. The licensees represented that the rule operated harshly on them owing to the reduction of duty and the increase in the cost of establishment. Section 43 was amended empowering the Central Board of Revenue to fix the percentage of establishment charges to duty realised in excess of which the charges will be payable by licensees. The Board fixed the percentage at 10 per cent. from April 1927. This was later on, from 1st April 1933, reduced to 8 per cent. This has given relief to many excise and modified excise licensees. Many of the factories are now not liable to cess. The cess in others comes to about an anna or so a maund.

(*d*) MANUFACTURE.

(*i*) *Sources.*

Salt is manufactured in factories situated at various places along the whole of the East Coast. There are about 54 factories covering an area of nearly 24,000 acres distributed along the sea board of the East Coast District as shown below :—

Districts.	*Salt factories.*
Ganjam	Ganjam.
	Sumadi.
	Pundi.
	Bhavanapadu.
	Mulapeta.
	Naupada.
	Calingapatam.
Vizagapatam	Konada.
	Bimlipatam.
	Balacheruvu.
	Polavaram.
East Godavari	Jagannaickpur.
	Penuguduru.
	Guruzanapalli.
Kistna	Pandraka.
	Manginapudi.
Guntur	Chinnaganjam North.
	Do. South.
	Kanuparti.

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Districts.	*Salt factories.*
Nellore	Pakala.
	Iskapalli.
	Krishnapatnam.
	Tada.
Chingleput	Kattur.
	Voyalur.
	Athipur North.
	Do. South.
	Vallur.
	Covelong.
	Cheyur.
	Chunampet.
South Arcot	Markkanam.
	Cuddalore.
	Manambadi.
Tanjore	Neidavasal.
	Tranquebar.
	Negapatam.
	Vedaranniyam.
	Thambikkottai.
	Adirampatnam.
	Kattumavadi.
Ramnad	Theethandathanam.
	Vattanam.
	Manakkudi.
	Morekolam.
Tinnevelly	Veppalodai.
	Arasadi.
	Karapad.
	Levingepuram.
	Sevandakulam.
	Urani.
	Kayalpatnam.
	Arumuganeri *cum*—Keeranur.
	Kulasekarapatnam.

A few factories formerly existed on the West Coast but they were closed in 1884-85, neither the soil nor the climatic conditions being suitable for the production of salt of a good quality.

(*ii*) *Season.*

The season of manufacture varies in different factories according as they are subject to the South-West or North-East Monsoons. The date of commencement and closure of manufacture depends not only on the period of the year in which the heaviest rains fall, but also on the amount of rainfall. In the northern districts where there is little or no rain in the later months of the year, the working season begins very early, and salt sometimes forms in the pans in January. The rains in some districts start from June and go on till October, so the manufacture ceases in June. In Nellore, June and July rains are usually light and manufacture continues till August or even September. In the Chingleput, South Arcot and Tanjore districts manufacture usually closes in September, while in Ramnad and Tinnevelly, it continues up to October. In Madras manufacture of salt is in a large measure subsidiary to agriculture. This gives employment to agricultural labour when there is little work in the field. So agricultural exigencies too have an influence on the date of commencement and cessation of manufacture. It begins when the labour of the salt ryots who also for the most part cultivate land is available. Such subsidiary employment is a good thing and one of the economic necessities of India.

(*iii*) *Preparation of clay beds.*

It is essential to have suitable beds for the crystallizing pans. Quantity and quality, especially the latter, of the salt produced depend upon them. The following methods which has been handed down from past generations to the present labourers is strictly followed in Madras.

First all vegetation is removed from the ground. If the soil is very hard and dry, it is dug up to one foot and the clods are broken. Brine is then let in so that the floor becomes muddy. It is then puddled under foot until it is dry, and is then allowed to set and harden ; when the surface of the bed shows signs of cracking, it is again irrigated with brine, and is then puddled under foot and allowed to dry and harden. It is then sanded and rammed, and then allowed to set and harden. Care is taken to prevent cracks. The bed is then ready for use. The preparation takes two to three weeks.

(*iv*) *Process.*

Salt is manufactured in Madras by solar evaporation of sea water. The method of manufacture is practically the same in all three kinds of factories. Some, however, evaporate sea brine, others back-waters, others again sub-soil brine of different densities varying from 3° to 16° B. Sea brine brought from tidal back-waters by channels is used in most factories. From the supply channels the required quantity of brine is distributed through a network of small irrigation channels covering the whole area of the pans. The supply of brine is controlled by sluices. The brine from the channels is baled into condensing beds by means of picottahs or slungs baskets—in some places pumping engines are now being used by wealtheir licensees—and is allowed to remain until it reaches the degree of density at which salt begins to form. The less soluble impurities such as calcium salts by that time

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separate from it; the brine is then run into crystallizing beds. The process of evaporation is allowed to continue in these beds until the magnesium salts, magnesium sulphate or carbonate tend to crystallise out at 32°B. The salt is scraped before they can form. The reservoirs, condensers and crystallizing beds are mere excavations in soil. There are two systems of salt cultivation :—

Single Irrigation System.—In this system the salt bed is irrigated to the depth of about 1″ or 1½″ with saturated 25°B brine which is evaporated until a layer of salt crystals generally a quarter of an inch thick has formed. This is raked up with wooden scrapers and heaped on the pathway to drain and the bed is irrigated with a fresh charge of brine. The salt is carried away to the drying platforms and placed in heaps to dry. The crystallizing process takes two or three days. The salt is scraped out when still covered with mother liquor. This is done to clear it from adherent mud in its passage from the bed. The irrigations and scrapings are repeated about every three days according to weather. The bitterns are rejected after every fourth or fifth scraping, and the beds are retamped. This method is followed in all the factories in the south of the Presidency and in most of the other factories.

The method has the advantage of quick returns. The crystals formed are hard, regular and compact, since even strong winds do not disturb such thin sheets of heavy fluid. The salt is, however, liable to be dirty and impure. It also contains magnesium salts as impurities. As the scrapings are frequent, the beds get damaged and have got to be retamped. Moreover, high labour charges have got to be incurred on account of frequent collections of light crops.

Accretion system.—The accretion system followed in Madras is somewhat different from the Sambhar lake system. Here thin sheets of brine 1″ or less depth are floated on the salt beds every four or five days ; the number of irrigations is about 6 and they are evaporated one after the other for a season of two months. The salt is deposited in strata, one layer above the other and so the salt forms a loose cake above three inches thick. This is broken up in bed under the mother liquor and removed by hand. It is heaped up on the edges of the pans to drain and dry. The salt produced by this method is pure and free from dirt. It lacks cohesion and the loose lumps fall asunder. It does not bear carriage and is easily reduced to a fine powder. The disadvantage of the system is that a large ready crop may be spoilt by a single shower of rain. The method is followed in a few factories in the Chingleput and South Arcot districts and even here is now being gradually replaced by the single irrigation system.

(*v*) *Experiments with pit brine.*

In 1930-31 an area of about 35 acres was worked in Vallur, Attiput North and Attiput South factories. 26 brine pits were dug in the three factories and the plots were worked with brine from these pits supplemented to some extent by sea brine baled from supply channels. The total output was 10,817 maunds in 1931-32 and the cost of production worked out to about 0|6|6 a maund. The experiment was discontinued from 1933 as the possibility of working with pit brine had been sufficiently demonstrated to the licensees.

(*vi*) *Weather conditions and their effect.*

The manufacture of salt is very much affected by dust storms and rains. Excessive rains may do extreme damage to salt already scraped and may also bring manufacture prematurely to a close. Dust storms besides spoiling the salt already scraped damage the beds. For instance, in 1930 unseasonable rains interrupted manufacture very much. In the Northern Division the production which was 48.98 lakhs in 1929-30 fell to 31.69 lakhs in 1930-31. In Ennore factories the manufacture proved a complete failure—about half a lakh maunds being manufactured against a dittam of 18 lakhs. Cyclones too cause considerable damage to heaps, buildings, etc.

(*e*) QUALITY OF SALT.

Madras salt is reddish in colour owing to red laterite soil on which it is made and is said to be liked in certain localities. Salt is sold in the Presidency by measure and not by weight, a circumstance which leads the licensees to manufacture light salt which will occupy a big volume. The licensees try to make a light salt and their methods leave it poor in sodium chloride contents. The consumer, however, has no objection to this. The licensee has no incentive to manufacture pure white salt. For this reason alone, apart from high freight charges, this salt would not find favour in Bengal. Tuticorn salt, however, is quite good and white as it is made from pit brine.

In the Vayalur factory at Ennore a model saltern was laid out in 1911 in general imitation of the Italian practice. The manufacture was conducted by Government. Reservoirs, condensers and crystallizers were well laid out, the condensing area being 75 per cent. of the whole. Manufacture was carried on taking care to eliminate all calcium and magnesium salts. The crystallizing beds were sanded and so the salt produced was pure, white and small-grained. It was used for the manufacture of table salt. In excise factories the licensee is depended upon to make salt suitable for his market. A standard of purity is, however, fixed in the interest of the consumer and the maximum of impurities permitted are 5 per cent. each for magnesium salts and dirt. The factory officer can refuse to stack salt which is of inferior quality. From monopoly factories samples are regularly sent for analysis, once a quarter from factories where sodium chloride content is over 93 per cent. and once a month from others. The factory officer can send sample from excise factories, whenever he likes. According to 1934 analysis, the salt in monopoly factories on an average contained 93.34 per cent. sodium chloride, 1.74 per cent. magnesium chloride, 1.31 magnesium sulphate, .87 per cent. calcium salt, and the rest dirt ; in excise factories 91.86 per cent. sodium chloride, 2.55 per cent. magnesium chloride and 1.68 per cent. magnesium sulphate, .89 per cent. calcium salts and the rest 3.02 per cent. dirt.

(*f*) STORAGE.

The salt is scraped from the pans and is put on the boundary ridges of the crystallizing beds and is given a preliminary drying there. It is then carried in baskets to the drying ground and spread in the form of long ridges in the direction of the prevailing winds. Sometimes salt is also washed in baskets in the crystallizing beds to remove impurities from it, before it is taken to the drying ground. After a week or so the salt is removed from the drying ground and dumped on to the storage platforms. It is weighed in Grainger 8 maund weighing tubs and stacked in heaps of 10, 20, 30 garce, *i.e.*, 1,200 2,400 and 3,600 maunds each. Strong winds usually blow at Madras and so big weighing machines are used for issues. From the very beginning there has been in force a meticulous system of control and accounts at every stage. The heaps are made in the form of a wedge resting on retangular base and having all the four planes inclined at an angle of 45°. At some places, storage is done in buildings erected for the purpose. The heaps are covered by straw, grass, palmyra leaves or tiles. The number of leaves used for thatching different heaps is fixed. The cost of thatching is borne by Government in the monopoly factories and by the licensees in excise factories. No uncovered heaps are kept. The heaps are numbered. The number boards are made of strong wood. The storing officers are responsible for the heaps.

Factory officers may refuse permission to store salt when they consider its quality to be below the prescribed standard. The circle Inspector's orders are final in this respect. Dirty, bad or wet salt is not allowed to be stored. Early commencement and storage of salt is always insisted upon. The coverings of heaps are renewed whenever necessary.

Storage by weighment into heaps is adopted in all factories but it was found that the process involved a considerable amount of handling and the salt was liable to get crushed. So the system of storage and sale in bags has been permitted under certain conditions since 1918. Under this system salt is weighed direct from the platforms into two-maund bags and the bags are stacked on the storage platform for sale. It is popular with licensees and merchants, as it enables them to dispose of the salt of the new season quickly. The retail merchants who sell salt by measure and not by weight also benefit under the bag storage system, as the salt undergoes less handling and crushing and gives a greater number of measures per maund than heaped salt. Salt stored under this system must be cleared within 10 days of bagging and all such bagged salt has to be removed before the end of the manufacturing season or re-stored in heaps in the usual manner. As a rule salt from the first scrapings is stored under the bag storage system and salt produced later in the season, when the output is more than the daily demand for sale, is stored in heaps and sold during the non-manufacturing season. During 1934-35 the quantity bag-stored and sold was 37.29 lakhs of maunds or more than 27 per cent. of the total production.

Storage in Madras Depot.—The Madras Salt Depot is situated in the Buckingham Canal in the northern portion of the city at Tondiarpet covering an area of about 50 acres. It is the storage ground for all salt of the factories at Ennore. The main line of the Madras and South Mahratta Railway siding runs into the platforms. The depot has a storage capacity of over 30 lakhs of maunds. The salt is brought from Ennore without weighments to the depot down the canal in

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barges covered with gunny covers and sealed. Canal transport is done on contract—2 to 3 annas per 120 maunds. The work of unloading, storing and forming into heaps also is given out on contract. In the Madras Depot all heaps are covered with tiles which are got from Bangalore. There is practically no wastage. In 1930-31 when manufacture failed at the Ennore factories which were then monopoly factories, excise salt was obtained from Tuticorn factories. Some salt was also got from Krishnapatnam and Cheyur circles by canal. At least 10 per cent. of the heaps are test-weighed to secure the accuracy of the storage accounts.

(*g*) PRODUCTION.

The following statement shows the quantity of salt manufactured and sold in each year for the fifty one years ending with 1934-35 :—

Year.	In lakhs of maunds.	
	Manufacture.	Sales (including duty free issues for industrial purposes).
1	2	3
1884-85	76·06	67·00
1885-86	57·21	69·70
1886-87	48·56	67·89
1887-88	88·90	70·65
1888-89	90·16	70·69
1889-90	92·44	71·28
1890-91	87·24	69·50
1891-92	97·89	70·95
1892-93	92·08	71·99
1893-94	73·78	72·63
1894-95	90·06	75·54
1895-96	91·47	76·54
1896-97	96·88	73·01
1897-98	64·64	75·85
1898-99	69·40	78·44
1899-1900	76·03	81·85

Year.	In lakhs of maunds	
	Manufacture.	Sales (including duty free issues for industrial purposes).
1	2	3
1900-01	90·23	87·00
1901-02	97·21	84·01
1902-03	97·56	83·24
1903-04	69·28	94·86
1904-05	102·73	94·92
1905-06	106·48	94·07
1906-07	108·79	97·40
1907-08	97·50	99·19
1908-09	121·67	103·78
1909-10	83·65	102·14
1910-11	124·54	103·65
1911-12	115·67	104·46
1912-13	129·50	107·34
1913-14	95·73	107·74
1914-15	81·50	112·26
1915-16	95·82	100·04
1916-17	131·14	116·55
1917-18	110·53	112·52
1918-19	166·20	122·11
1919-20	144·71	116·34
1920-21	126·71	113·71
1921-22	120·65	119·81
1922-23	125·30	128·15
1923-24	133·20	110·03

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Year.	In lakhs of maunds.	
	Manufacture.	Sale (including duty free issues for industrial purposes).
1	2	3
1924-25	110·77	124·68
1925-26	92·92	118·27
1926-27	134·45	117·67
1927-28	145·66	123·88
1928-29	121·02	121·81
1929-30	113·74	118·79
1930-31	98·76	110·35
1931-32	146·43	119·78
1932-33	128·48	111·31
1933-34	129·81	126·69
1934-35	136·74	118·35

In the Madras Presidency, on the Coromandel Coast, there are about 60 salt stations scattered up and down a line of coast about 1,000 miles. In 1893-94 the area under salt cultivation was about 13,800 acres ; it rose to 16,000 acres in 1903-04, to 22,300 acres in 1928-29 and 24,000 acres in 1934-35. The total number of persons registered as holding salt pans is over 8.000. The average annual production of all the factories about 1880 was 70 lakhs only ; the production has risen with the increasing population and now it varies from 100 to 120 lakhs maunds per annum. Variations are largely due to the nature of season. There was the record output of over 166 lakhs during 1918-19 due to decrease in imports of foreign salt into Calcutta in consequence of the Great War and a shortage of salt in the Northern India Salt Sources. Many works are limited to a Dittam, a small order of salt calculated on the average sales of the previous year beyond which limit they cannot manufacture. They finish their limit and then stop work. The Department has seldom had to face a deficit.

In 1916-17 there were 65 factories including Extensions of old factories separately reckoned, working in 48 localities. Of these 17 were wholly Monopoly factories, 39 wholly Excise factories, and 8-9 Modified Excise factories. But gradually the Monopoly factories are being reduced by converting them into excise factories. The policy of the Department in recent years has been to close Monopoly factories whenever they cannot be worked economically under that system and are not definitely needed and to depend on the dittam reserved from Modified Excise factories for the control of prices, if necessary. Only a few factories are now worked by Government under the Monopoly system; namely the Polavaram factory in the Vizagapatam district and the Karambalam Monopoly block of the Murkkanam Factory in the south Arcot district. The Monopoly factories yield only a small percentage of the total. In 1930-31 they gave only 1½ lakhs out of 98 lakhs, in 1931-32 11 lakhs out of 146½ lakhs, in 1932-33 12½ lakhs out of a total of 128½ lakhs, in 1933-34 5.01 lakhs out of 129.77 lakhs and in 1934-35 4.83 lakhs out of 136.74 lakhs.

In recent years, the Madras Depot where the salt manufactured in the Ennore factories is transported and stored for sale has lost most of its markets to the adjacent excise and modified excise factories situated in the Chingleput and Nellore Districts. Though manufacture in the Ennore factories was restricted from 1930-31, stocks at the Madras Depot increased owing to poor sales and at the end of 1933-34 they amounted to as much as 11.96 lakhs of maunds, the normal annual sales being only 4½ lakhs. The Government of India, therefore, decided that the Ennore factories should be closed from 1st January 1936 as factories for the sale of salt to Government. With a view, however, to alleviate any hardship to the existing licensees, the Government of India were pleased to order that the factories would be re-opened under modified excise conditions if the existing licensees wished to work under these conditions and that certain special concessions would be granted temporarily to these licensees, *viz.*, the free use of the Tondiarpet Depot for storage and sales for a period of two years from 2nd January 1936. Under these concessions the licensees will not be liable to pay the cost of repairs works and the interest on capital cost of works of the Depot and the property tax payable on the Depot premises to the Madras Corporation. These are liberal concessions and most of the licensees of the Voyalur, Attiput North and South and Vallur factories have signified their willingness to work these factories under Modified Excise terms. The licensees of the Kattur factory alone owing probably to its location at the extreme north of the group and its greater distance from the Madras Depot have not accepted the offer. The four factories mentioned above have been re-opened under the modified excise system with effect from the 2nd January 1936.

The right of Government to purchase salt from the licensees of modified excise factories is exercised to a limited extent only. In 1931-32 Government purchased about 1,300 maunds only under this right. In 1932-33, 1933-34 and 1934-35 Government did not consider it necessary to exercise this right as the prices charged by the licensees were reasonable and there was no need to maintain a Government stock to control prices. Generally a big stock remains in Madras factories. It may vary from 35 to 50 lakhs.

(*h*) COST OF PRODUCTION.

In the beginning in calculating the cost of production of Government salt the establishment charges were not included. From 1905 it was decided that establishment charges in excess of 5 per cent. of the duty on the salt sold in the previous year should be included. This was followed till 1927-28, when the limit was fixed at 10 per cent. This limit is 8 per cent. these days. This is the cess payable by excise licensees. The cost of production varies from factory to factory according to local conditions. In 1903-04 it ranged from 1 anna 8 pies to 5 annas 2 pies per maund, in 1923-24 from 2 annas 10 pies to 5 annas 6 pies, and nowadays it varies from 3 to 6 annas a maund.

The average cost of production in Government factories works out at 4 annas 8.4 pies per maund at Polavaram and 3 annas 8.5 pies at the Karambalam block of the Markanam Factory. These figures include land assessment, land and village cess, kudivaram (*i.e.*, payments to the manufacturers), interest on the capital cost of works at 5½ per cent., repairs to works connected with manufacture and storage, one-third of the establishment charges, and pensionary charges for the same, storage charges, and other miscellaneous expenditure connected with manufacture. In Excise factories it is impossible to say definitely what the cost of production is as the licensees are not required to disclose the true cost, but it may be taken to be between 2 annas 6 pies and 4 annas 5 pies a maund and depends largely on the cost of labour in the particular locality as well as the strength of the brine available. No part of the cost of the establishment is debited to an Excise or Modified Excise factory or consequently added to the cost of manufacture unless the cost of this establishment exceeds 8 per cent. of the duty realised by the sale of salt from the factory. Normally no excess establishment charges are recoverable from Excise or Modified Excise licensees.

(*i*) SYSTEM OF SALES AND ISSUES.

In Madras each factory (the whole area taken up for the manufacture of salt) is securely enclosed and guarded by a force of armed peons and salt cannot be removed without elaborate checks in which at least two superior officers are concerned.

Each factory in Madras is furnished with standard maund weights and three different types of weighing machines are supplied for use on each selling platform. One is used for weighing salt in bulk prior to storage, another for issues and a third for accurate check weighment of bags before removal from the factory. There are elaborate rules for using and testing these machines and carrying out check weighments.

The licensee or the buyer in case of Excise salt and the buyer in case of Monopoly salt puts in an application in the factory office and deposits duty and cess in case of Excise salt (price being paid to the licensee direct) and duty and price in case of Monopoly salt in a District or Taluka treasury. He gets a delivery order which he takes to storage platforms with his bags and coolies. The salt is issued from a heap, being weighed on 2-maund weighing cups (cup scales) and filled into bags which are then sewn. The work is done under the immediate supervision of a petty officer or peon. The total number of bags are carried to gate, where 15 per cent. are check-weighed by the factory officer on a Pooley's or Avery's platform machine. After the check weighment, the consignment is allowed to pass out of the factory. In case of excise salt all handling and weighing charges are borne by the licensee.

Weighments start early and check weighments have got to be completed by a reasonable hour. Consignments are weighed out in the numerical order of the delivery orders. In Monopoly factories heaps are sold in order of storage except when sold out of turn. In Excise factories the licensees are as far as possible, induced to sell off their old stock before exposing their new stock for sale in order to minimize the difficulties in connection with wastage.

Issues from Madras Depot.—The consignments for removal by carts are weighed on the cup scales. Weighment of salt for transit by rail is also done by cup scales, but the check-weighment is conducted on the weighbridge. Bags are first filled on 2-maund cup scales and weighment is conducted by petty officers as preliminary weighments at Sambhar. The work of uncovering heaps, filling and sewing of bags, loading, etc., is given out on contract. All salt dispatched by rail is normally sent out bagged and in closed wagons. Salt is issued to the French Government under an old Convention. A contractor is employed to transport salt to Pondicherry or Mahe. The North Arcot and Chittoor districts are the chief markets for Madras Depot.

The salt credit system which was in force for many years and under which removal of salt by merchants and licensees was allowed on deposit of securities in 6 months, was first modified and later abolished. From 1st October 1931 the period of credit was reduced from 6 to 3 months, *i.e.*, all credits granted on or after 1st October 1931 were allowed to run only for three months instead of six from the date on which they were opened. With effect from 1st April 1932, the credit system was abolished.

(*j*) SELLING PRICE.

Under the Monopoly system the private manufacturers, who are paid kudivaram at different rates varying with the locality, can sell salt only to Government. The salt is re-sold by Government to traders at a price calculated to cover the purchase money paid to the manufacturers and the expense of storage, transport, etc. For many years the selling price was reduced to an average for the whole Presidency. This price was independent of duty and was at first 2 annas. By Act XVIII of 1877 it was fixed at 3 annas per maund, which, except in special cases, continued to be the rate till 1905, when the system of auctions was introduced in factories where sales had to be restricted owing to low stocks. During 1919 the policy of Government in regard to the sale of Government salt was defined as follows :—

(1) The price of salt should be kept as low as possible in the interests of the public ; the primary object of Government stocks is to control the prices charged by the trade.

(2) When stocks are so short that sales at the fixed price only mean that the traders, and not the public, buy up the Government stocks and pocket the difference between the fixed and the market rates, Government salt should be sold by auction.

(3) Government sales should be so restricted as always to keep a substantial Government reserve in stock, as widely distributed over the Presidency as possible.

(4) Government stocks should not be allowed to get too old, but should be kept constantly renewed ; otherwise they become unsaleable.

In accordance with the above principles the prices at the several factories were being revised from time to time and auctions conducted whenever necessary. In May 1927 the Central Board of Revenue passed revised orders in regard to the calculation of the cost of Government salt and its selling price. Under these orders the sale price of Monopoly salt is fixed with reference to the profit or loss on the transactions in the factory in the previous year *i.e.,* if there had been profit in the previous year, the selling price is reduced, but if there had been a loss, the selling price is raised so as to recover the loss. In normal times, however, Monopoly salt is sold at about cost price.

The following table gives the average price fetched for Government salt for the Presidency as a whole and the average selling price for Excise factories :—

Year.	Monopoly factories.		Excise factories.	
	Annas.	Pies.	Annas.	Pies.
1924-25	4	11	3	5
1925-26	6	3	4	11
1926-27	6	1	5	0
1927-28	4	10	3	5
1929-30	5	2	3	4
1930-31	6	7	3	11
1931-32	6	1	3	3
1932-33	4	10	3	[illegible]
1933-34	4	7	3	0
1934-35	3	3	2	11

In Excise factories the price depends on supply and demand. When there is successful manufacturing season and a large output, competition is naturally stimulated and price falls. Government does not regluate price in such cases. If manufacture fails at some places, the price rises. This was the case in 1930-31 when stocks were reduced owing to bad manufacturing season and so the prices rose a bit. The policy of the Government is to keep the price as low as possible. Government stocks are kept with this object.

Retail sale of salt in Madras is made by measurement. The question whether retail sale of salt by weight should be made compulsory by law was examined by the Salt Committee of 1903. They were of the opinion that it would not be advisable to interfere with the established system. Salt is still sold by measure. A Madras measure is of about 120 tolas.

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(*k*) DISTRIBUTION.

The distribution of Madras salt is shown in the following table :—

In lakhs of maunds.

Year.	Madras Presidency.	Mysore.	Travancore.	Cochin.	Straits.	Ceylon.	Orissa.	Central Provinces.	Nizam's Dominions.	Bengal.		Total.
										Rail.	Sea.	
1908-09	87·90	0·63	..	..	2·32	..	9·44	0·86	2·40	0·19	..	103·74
1909-10	88·03	1·14	..	..	0·70	..	9·01	0·59	1·84	0·22	0·04	101·57
1910-11	88·69	0·98	..	..	1·27	..	8·92	0·55	2·31	0·29	..	103·01
1911-12	89·54	0·89	..	..	1·31	..	9·95	0·56	1·83	0·33	..	104·49
1912-13	90·92	1·03	..	..	1·07	..	10·85	0·76	2·03	0·27	0·32	107·25
1913-14	89·82	1·13	2·52	..	0·40	..	10·63	0·96	2·00	0·35	..	107·81
1914-15	94·03	1·10	0·47	..	0·78	..	10·24	0·53	1·65	0·14	3·17	112·12
1915-16	81·94	0·93	1·00	..	1·53	..	9·93	0·40	0·84	0·04	3·12	99·71
1916-17	93·09	1·10	0·63	0·39	..	0·26	12·06	0·98	1·84	1·13	5·10	116·45
1917-18	86·84	1·03	0·92	1·74	..	0·55	12·99	0·68	1·41	6·08	0·28	112·52
1918-19	95·92	1·42	4·45	3·07	..	0·76	10·63	0·96	2·81	1·96	..	121·98
1919-20	95·94	1·66	2·47	0·17	..	0·63	11·25	1·62	1·74	0·68	..	116·18
1920-21	93·47	0·94	4·81	..	..	0·37	10·48	1·73	1·51	0·26	..	113·57

In lakhs of maunds.

Year.	Madras Presidency.	Mysore.	Travancore.	Cochin.	Straits.	Ceylon.	Orissa.	Central Provinces.	Nizam's Dominions.	Bengal.		Total.
										Rail.	Sea.	
1921-22	91·22	1·21	5·02	..	0·46	0·10	11·66	1·34	1·95	0·49	6·22	119·67
1922-23	101·06	1·16	3·14	..	..	1·16	10·46	2·43	3·84	0·70	3·97	127·92
1923-24	93·18	1·02	4·18	..	..	0·20	7·65	0·96	2·39	0·13	..	109·71
1924-25	103·52	1·36	3·99	..	..	0·50	9·78	1·99	2·69	0·38	0·10	124·31
1925-26	96·70	1·18	5·01	..	..	3·85	7·92	1·35	1·66	0·16	..	117·83
1926-27	95·73	1·02	4·14	..	..	4·48	9·67	0·86	1·37	0·15	..	117·42
1927-28	100·18	0·93	3·87	..	..	3·76	11·51	1·31	1·63	0·20	..	123·39
1928-29	100·28	1·01	2·32	..	..	2·43	11·98	1·35	1·78	0·20	..	121·35
1929-30	98·11	1·18	0·79	..	..	..	13·96	1·37	1·83	0·18	0·86	118·28
1930-31	94·54	0·54	0·25	..	..	..	11·16	1·20	1·62	0·59	..	109·90
1931-32	97·82	0·90	0·27	..	..	..	12·47	1·56	1·64	0·11	4·59	119·36
1932-33	88·92	1·38	0·23	..	..	..	10·68	2·96	1·69	0·75	4·22	110·83
1933-34	99·72	1·72	1·44	..	..	..	10·52	3·62	5·33	0·04	3·48	125·87
1934-35	98·80	0·59	1·64	..	..	..	7·87	3·26	2·07	..	4·12	118·35

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The issues to the Presidency itself show remarkably little variation, the lowest figure being 81.94 in 1915-16 and the highest 103.52 in 1924-25. The low issues in 1915-16 were due to the restrictions placed on the sales of Government salt on account of low stocks, the season having been unfavourable, and to the Government of India's order II of 1916 restricting issues of all salt. The highest figure in 1924-25 appears to be due to the fall in retail prices and the replenishing of supplies after the reduction in duty. The demand from Mysore has remained fairly constant and in spite of competition Madras salt is holding its own there against Bombay salt. In the Nizam's Dominions there is no real competition, Bombay supplying the western tracts and Madras the eastern. Issues from Madras, however, have shown a tendency to increase since 1927-28 and the large quantity issued in 1933-34 was due to the shortage in Bombay. Export by rail to the Central Provinces, Orissa and Bengal increased during the War years but have since fallen except to the Central Provinces and Orissa. The issues to Orissa show a marked increase since 1927-28 and this is due to the enterprise shown by the capitalist licensees at Ganjam and Naupada. The increase in the quantity sent to the Central Provinces during 1933-34 was due to the shortage in Bombay mentioned above. Formerly Bombay had the whole supply to Travancore and Cochin but since 1913-14 the Durbar has been taking salt from Tuticorin. The issues to Travancore in recent years show a tendency to decrease, which is due to extended local manufacture in the State. There have been practically no issues to the Straits since 1915-16. The partial failure of the Ceylon factories for a time afforded an excellent market for Tuticorin salt, but the issues in recent years fell off on account of the enhanced import duty levied on foreign salt by the Ceylon Government and since 1929-30 exports to Ceylon have entirely stopped. Exports to Calcutta are dealt with separately.

(*l*) EXPORTS TO CALCUTTA.

Attempts were made to export salt to Calcutta by sea during 1914-17 and 1921-1923. The first attempt was made by one Mr. Somasundaram Chettiyar who secured the best salt from the Government factory at Vallur in the hope of building up a market at Calcutta ; the transaction did not prove profitable. Exports in 1921-23 were chiefly due to the changes in duty. They occurred towards the end of the financial years 1921-22 and 1922-23. A large part of the salt exported could not be sold and had to be destroyed. In 1929 the Mahalingam Salt Works, Tuticorin, exported 86,000 maunds to Calcutta by sea. There was no export in 1930. Tuticorin salt is of very good quality and can sell in the Bengal market, but the quantity of pit brine being limited, it is not possible to increase its production appreciably. Since protection to Indian salt was granted under the Salt (Additional Import Duty) Act, 1931, there has been a revival of exports to Calcutta. During 1931-32, 1932-33, 1933-34, and 1934-35, 4.59, 4.22, 3.48, and 4.12 lakh maunds of salt were exported. This salt has sold at prices ranging from Rs. 41 to Rs. 45 per maund.

(*m*) PREVENTIVE MEASURES.

The levy of duty on salt is ensured by (*a*) fencing and guarding the pans in which it is manufactured, (*b*) guarding the salt while it lies on the ridges and on the drying grounds, (*c*) its storage after careful weighment in heaps or in bags on fenced and guarded platforms, (*d*) its issue under supervision by a second weighment in the case of salt stored in heaps and by a careful counting in the case of bag-stored salt, (*e*) check-weighment of every consignment by superior officers and (*f*) removal under permit from the factory. Factories have also got to be guarded. Whenever possible, they are enclosed by a cactus hedge. In some cases, in the absence of cactus, screw pine, dry thorn or even barbed wire is used, while the plan of fencing only the crystallizers has been adopted in a few recent instances. The circumference of the fartory is divided into posts of varying length according to the locality, the state of the fence, the character of the neighbouring villagers and similar considerations. Each post is divided into two beats. To every two posts there is a petty officer and to every post six peons. As a check over the work of the petty officer and the peons, Sub-Inspectors and Assistant Inspectors make frequent patrols by day as well as by night. Storage is done by Sub-Inspectors and sales are conducted as a rule by petty officers and Sub-Inspectors. The work of check-weighment is the business of the Assistant Inspector. It is believed that the above safeguards are effective in preventing salt from passing into consumption without payment of duty.

Illicit Salt.—The sources from which illicit salt can be obtained are the manufacture of salt from salt-earth obtainable in saline tracts and the clandestine removal of salt which forms spontaneously in swamps. Since the reorganisation of the Salt Department in 1882 the manufacture of earth-salt has been almost entirely suppressed by the establishment of a preventive force throughout the Presidency. But there are extensive swamps in a few districts of the Presidency where large formations of good spontaneous salt occur during the hot months of the year, *e.g.*, in the Ramnad and Mudukolathur Taluks of the Ramnad District, in the Tiruturaipundi Taluk of the Tanjore District and the Gudur and Sulurpet Taluks of the Nellore District. These areas are a source of great temptation to the inhabitants in and around them to collect and remove the spontaneous salt in large quantities and sell it at very cheap rates. The salt concessions have been withdrawn from these areas in consequence of their abuse. Preventive parties consisting ordinarily of a Sub-Inspector and peons, the strength of the latter varying according to the locality are allotted to the several circles into which the Presidency is divided and to the preventive areas of Coimbatore and the Ceded Districts. The number of parties is determined with reference to the extent of crime prevalent and the area to be patrolled. When offenders are detected, they are sent before the Inspectors or empowered Assistant Inspectors who after holding a preliminary investigation send the accused for trial before a Magistrate, or, if dissatisfied with the evidence, release them. The empowered Assistant Inspectors and all Sub-Inspectors of the Department have been empowered to grant bail to accused persons to appear before the Inspectors. In recent years there has been a marked increase in the number of offences against Salt Laws, the number reported, which was 238 and 231 in 1930-31 and 1931-32 having risen to 607 in 1932-33, 843 in 1933-34 and to 1102 in 1934-35. The increase is chiefly due to widespread abuse of the Salt Law Concessions granted in March 1931 permitting the collection and manufacture of salt by local residents in villages immediately adjoining areas where salt could be collected or made. Owing to this abuse the concessions had to be withdrawn from

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several areas and the preventive staff strengthened. The abuse still exists chiefly in the Adirampatnam circle and in the Ceded Districts. In the former it consists of collection and removal of swamp salt in the Tiruthuraipundi Taluk from which the salt concession has been withdrawn while in the Ceded Districts manufacture of contraband salt under the " Moda " system is resorted to on an extensive scale.

(*n*) HISTORY OF ADMINISTRATION.

The Government salt monopoly in Madras was first mooted by the Board of Revenue and was established about 1805. The agency entrusted with the task in the initial stages was, from 1805 to 1808, a General Agent at the head of Collectors. In 1808 the Collectors were placed in direct subordination to the Board of Revenue on a commission basis. The Commission plan was, however, done away with in 1836. The Agency of administration soon came in for criticism. In 1852 the Court of Directors themselves suggested the appointment of special officers over Salt and Abkari as distinguished from Revenue ; Mr. Plowden also made recommendations for segregation along indentical lines, but no action was taken beyond the appointment of Salt Deputy Collectors in some Districts. As has been seen before, in 1876, a Commission was appointed under the orders of the Government of India, to investigate the whole question of the administration and the collection of Salt Revenue in the Presidency. As a result of their recommendations, the administration of the Salt Revenue was placed under a separate department with a Commissioner, Deputy Commissioners, Assistant Commissioners, Inspectors and the necessary subordinate staff. The reorganisation of the Department was completed in 1884-85 both in the maritime districts and in the interior. In the same year the Government decided to entrust to the Commissioner the supervision of the Abkari Revenue of the Presidency and to employ the Salt Preventive force of Abkari work conjointly with Salt duties. The Commissioner of Salt and Abkari Revenue was then made an ordinary Member of the Board of Revenue. The joint administration of the Salt and Abkari Departments continued till 1924, when, as a result of the Reforms, ' Salt ' became a ' Central ' subject, and " Excise " a " Provincial transferred " subject. With effect from 1st April 1924 a separate Salt Department was created with a Collector at its head, independent of the Board of Revenue, Madras. The Collector was assisted by a Secretary who was of the grade of an Assistant Commissioner. The Department was at first under the control of the Madras Government, but was transferred to the control of the Government of India administering through the Central Board of Revenue from 1st January 1926. The Presidency was at first divided into two Assistant Commissioner's Divisions with headquarters at Cocanada and Negapatam, but it was soon found necessary to create a third Division with headquarters at Madras. In pursuance of the policy of retrenchment the post of the Collector of Salt Revenue was merged with that of the Collector of Customs, Madras, with effect from 1st March 1932. From the same date the department was placed in the immediate charge of a Deputy Commissioner and the post of the Secretary to the Collector of Salt Revenue was abolished. From 1st March 1932 to 1st February 1934 the department was administered by the Collector of Customs, Madras,

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as *ex-officio* Collector of Salt Revenue assisted by the Deputy Commissioner. With effect from 1st February 1934 the administration of the Customs outports in the Madras Presidency was amalgamated with that of the Salt Department. The combined Department is now administered by the Collector of Customs and Salt Revenue, Madras, assisted by the Deputy Commissioner and three Assistant Commissioners. The pay of the Deputy Commissioner is Rs. 1,000—100—1,500 and that of Assistant Commissioners is Rs. 600—50—900. Under the Assistant Commissioners there are now 17 Inspectors of whom 11 are in charge of combined Salt and Customs Circles and 6 in charge of purely Customs Circles including Land Customs. The Inspectors are on a time-scale of pay of Rs. 300—30—540. The pay of all grades of officers from the Deputy Commissioner downwards has recently been revised.

Each circle comprises 3 to 9 factories. The names of the circles with their headquarters and the factories in each circle are shown below :—

Circle.	Headquarters.	Factories.
Ganjam	Ganjam	Ganjam.
		Sumadi.
		Pundi.
Naupada	Naupada	Bhavanapadu.
		Mulapeta.
		Naupada.
		Calingapatam.
		Konada.
		Bimlipatam.
Penuguduru	Penuguduru	Balacheruvu.
		Polavaram.
		agannaickpur.
		Penuguduru.
		Guruzanapalli.
Kanuparti	Kanuparti	Pandraka.
		Manginapudi.
		Chinnaganjam, North.
		Chinnaganjam, South.
		Kanuparti.
Tada	Tada	Pakala.
		Isakapalli.
		Krishnapatnam.
		Tada.
Madras Depot	Madras (Tondiarpet) ..	Kattur.
		Voyalur.
		Attipur, North.
		Attipur, South.
		Vallur.

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Circles.	Headquarters.	Factories.
Markkanam	Markkanam	Covelong.
		Cheyur.
		Chunampet.
		Markkanam.
Cuddalore	Cuddalore, O. T.	Cuddalore.
		Manambadi.
		Neidavasai.
		Tranquebar.
		Negapatam.
Adirampatnam	Adirampatnam	Vedaranniam.
		Thambikkottai.
		Adirampatnam.
		Kuttumavadi.
Vattanam	Vattanam	Theethandathanam.
		Vattanam.
		Manakkudi (under orders of closure).
		Morekolam.
Tuticorin	Tuticorin	Veppalodai.
		Arsadi.
		Karapad.
		Urani.
		Levingapuram.
		Sevandakulam.
		Kayalpatnam.
		Arumuganeri—*cum*—Keeranur
		Kulasekarapatnam.

The subordinate establishment comprises a number of Assistant Inspectors, Sub-Inspectors, clerks and menials. The circle office is the unit of administration and the Inspector is primarily responsible for the efficiency of the circle and for the consolidation and submission of the stock and cash accounts. Each salt factory is in the immediate charge of an Assistant Inspector who is responsible for the proper administration of his charge and for all works connected with manufacture, storage and sale of salt. Sub-Inspectors work directly under the orders of the Assistant Inspectors. Petty officers are entrusted with the supervision of the peons and also conduct sales. The protection of the pans and platforms forms the principal work of the peons. In addition to this and other ordinary duties, the peons execute petty works and repairs. They are instructed in the use of fire arms and are taught some drill.

The burden of manufacture and handling of salt is all on the licensees. The duty of the Salt Department is to make over the finished product to the purchaser on the storing ground and the Department is free from responsibilities regarding labour, bagging, loading, etc. Besides, no elaborate system of indenting through the treasuries like Northern India exists in Madras. Moreover, there are no distribution problems such as many a time confront the N. I. Salt Revenue Department. Government has been gradually abandoning the Monopoly factories and even relaxing control over the Excise factories, but still it has ample powers to reserve or purchase stocks and control prices. The Madras Salt Department is not so overburdened with duties and responsibilities as the N. I. Salt Revenue Department.

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CHAPTER XII.

Bombay Salt Sources.

A.—HISTORICAL.

Manufacture of salt in the Bombay Presidency has been going on from times immemorial. Natural salt is found at some places along the sea-coast of Bombay and along the borders of the Runn of Cutch. The natural salt was not used for human consumption, but during recent years owing to the grant of concession by the Government of India people residing in the neighbourhood use this salt for domestic consumption. Prior to the advent of the British, the 'Peshwas' had a right to levy excise duty on salt. It was by Act No. XXVII of 1837 that a regular duty of Re. 0-8-0 per maund was first levied in lieu of transit duties in force prior to this date. Thus a regular excise on salt in Bombay dates only from 1838. The monopoly of salt manufacture and sale was never enforced here as, for instance, in Bengal or Madras. Duty here was much lower than in Bengal till about 1864 when the Government of India pressed for equalization throughout India and the duty was first raised from Rs. 1-8-0 to Rs. 1-13-0 and then to Rs. 2-8-0 a maund. There have been no saltpetre works in Bombay. Smuggling and illicit manufacture were prevalent for some time, but preventive measures were adopted to check them. Manufacture of salt in the Runn of Cutch was going on at numerous places, but about 1873 the work was concentrated at Kharaghoda. This was in view of the recommendations of Mr. W. G. Peddar, an officer on special duty, who reported on the Salt Industry in Bombay in 1869. Similarly all sea salt works in Gujarat except those at Dharasna and Chharvada were closed by 1878-79. Agencies were opened for sale of Baragra salt at important places. The whole Department was reorganised according to Mr. Peddar's recommendations and a Collector of Salt Revenue was appointed as the Administrative Head of the Department. The Transport of Salt Act of 1879 was passed to prevent illicit landing of non-duty paid salt from Kathiawar, Daman and Goa. A preventive line now operates against the salt manufactured in the Portuguese territory and there are land Customs stations on the Goa Frontier.

Here as elsewhere agreements for the prevention of manufacture of salt were entered into with the rulers of Indian States. Details will be found in the Chapter dealing with agreements. About 1853 the Gaekwar of Baroda wanted to establish salt works and open ports for transport on the coast line within his own territory, but the Government did not agree to this. Permission to manufacture salt at Mithapur in Okhamanda Sub-Division was, however, given about 1924. The Baroda agreement in regard to Okhamandal permits the export of salt direct to foreign ports and Bengal without touching at any intermediate port, British or Indian. In recent years Dhrangadhra State was also allowed to manufacture Baragra salt at Kuda and other maritime States, such as Navanagar, Bhavnagar, Porbandar, Morvi, have also been allowed to export salt to Bengal and foreign countries.

The policy of the Bombay Salt Department has been to leave manufacture and sale at the sea salt works in private hands so that there may be free competition between different kinds of salt. Under exceptional

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circumstances only Government undertakes manufacture such as at Dharasna in Surat District in Gujarat and Kharaghoda on the borders of the Lesser Runn of Cutch. The Department charges cost price and duty only and leaves the subsequent disposal of salt to ordinary channels of trade. In view of this principle the few Government works in Konkan are leased to private persons. This is advantageous to the public inasmuch as it insures the largest supply at the lowest cost and is advantageous to revenue.

B.—SOURCES OF SALT.

(*i*) Baragra Salt.

Manufactured at the Pritchard Salt Works, Kharaghoda.

(*ii*) Sea Salt.

Manufactured in sea salt factories along the coast.

(*iii*) Foreign or Imported Salt.

C.—BARAGRA SALT.

Baragra salt is manufactured from sub-soil brine, drawn from wells, at Kharaghoda and Udu on the border of the Lesser Runn of Cutch. At Kharaghoda and Udu there are Government salt works and salt is manufactured on Government account by the manufacturers called " Agarias ". The " Agarias " are given licences annually. They are more or less labourers and are bound by the conditions of the licence. They are paid advance and a fixed price on the quantities delivered in the stores. The price was Re. 0-2-0 a maund, but was raised to Re. 0-2-3 in 1929. There are at present about 1,300 Agarias. Manufacture at Kharaghoda was started in 1873 and Udu works about 8 miles from Kharaghoda were opened in 1881-82. They are connected with Kharaghoda by a line of rails. Baragra salt forms in large cubical crystals from ½″ to ¾″ in diameter each of which is built up from a number of smaller crystals. The salt is extremely hard and can stand transport over long distances. Dhrangadhra State has also been allowed to manufacture this kind of salt for consumption in its territory and in Kathiawar and for export by sea to Calcutta. Other States can only manufacture inferior or ' Ghasia ' salt under terms of their agreements for local consumption or export by sea to Calcutta.

(*a*) Kharaghoda—System of Manufacture.

Salt is manufactured by solar evaporation of brine drawn from wells. The Runn is a sheet of water several feet deep during rains, but dries up quickly after rains and in winter is nothing but a vast clay plain. In this clay at varying depths, 12′ to 30′ of brine is found over considerable areas and is ascertained by experimental well sinking. Salt pans too are constructed in this area. The density of the brine is very high even up to 22°B.

The pans are about 650 in number, each pan is usually about 250′ long, 60′ wide and 1′ deep ; the bottom of the pan is of hard clay and is practically water-tight. Work commences about the beginning of October when the rains cease. The wells are re-opened, cleaned and repaired and irrigation channels are dug. Each pan is supplied with brine from one or two wells dug near it. The wells are about 9′ in diameter and about 15′ to 30′ deep. Brine is lifted by a long lever attached to a wooden upright. The short end of the lever has a weight and the long end carries an earthen pot. Pans are surrounded by low walls of clay. The pan is flooded with brine 4′ or 5′ deep and a crust about ¾″ is formed. This is not scraped, but is broken up to separate the crystals and the pan is charged with fresh brine. This is the accretion system also followed at Sambhar, though at the latter place the crust is not broken. The brine is kept at least about 3″ above the salt crust which is frequently raked up. The crop is ready after about 5-6 months. Bitterns are cleared half way through the season and also at the time of harvesting the crop in April. The crystals are of big size, and regular form and very hard. They vary in colour from yellowish grey to white. On an average, a pan produces 4,300 maunds of salt. The working season lasts from November to April.

At Kharaghoda bitterns are commercially utilized by the Pioneer Magnesia Works. They manufacture epsom salts and magnesium chloride from bitterns. About six or seven thousand tons of magnesium chloride are annually manufactured. Government gets royalty at Re. 1 per ton on the manufactured product sent out. The Company has also got a refinery for refining salt.

(*b*) Storage.

Pans are constructed in double lines and a railway siding running between the lines connects them with the main store at Kharaghoda. The furthest pans at Udu are about 8 miles away. Salt is raked from the pans and is piled in heaps from where it is loaded into open wagons and hauled by railway engines. At Kharaghoda the wagons pass up an incline and enter the closed store (a large warehouse 400 running feet constructed in 1873-74 and divided by partitions into 8 compartments) at a height of 21 feet. This closed store can accommodate 5 lakhs of maunds. Inside this store the rails are supported on wooden trestles and masonry piers. When the whole rake is inside the store, the side flaps of the wagons are opened and the salt drops down into the store, coolies being employed to empty the wagons completely. When the closed store has been filled, the rake is taken through it on to the high level siding, which was constructed in 1883-84. The original open stores were extended in 1910-11 and again in 1921-22. The total length of the open store is now 1,758 running feet. In 1921-22 a second set of overhead rails was constructed parallel to the first in order to store the large quantities of salt then being produced. The open store has a capacity of 21 lakhs maunds. The wagons used are special open wooden wagons with falling sides and of a capacity of nearly 200 maunds each. 16 per cent of the wagons selected at random are test-weighed and the total quantity of salt stored is thus estimated. The salt store stands on a platform on both sides of which weighments are conducted and issues made to wagons drawn up at a ground level to platforms outside. A fixed rate per wagon is paid to the B. B. & C. I. Railway for the haulage of salt. The total length of salt sidings is about 26 miles. The storage is finished in about a month. The cost of storage exclusive of haulage charges varies from year to year. During 1934-35 it worked out to Rs. 281 per lakh maunds of salt. Formerly salt was also heaped up in big prism-shaped heaps. This is no longer done. The wastage during the monsoon is considered to be about

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5 per cent. depending, of course, on the rains. It amounts to over a lakh of maunds every year. About 450 pans are worked at Kharaghoda and about 200 at Udu. Storage takes about a month only. The average annual production at Kharaghoda is about 30 lakhs.

(*c*) PRODUCTION.

The following table shows the production of Baragra Salt from the year 1908-09 onwards :—

Year.	Production in lakhs of maunds.		
	Kharaghoda.	Dhrangadhra.	Total.
1908-09	26·8	..	26·8
1909-10	26·21	..	26·21
1910-11	31·19	..	31·19
1911-12	30·18	..	30·18
1912-13	28·27	..	28·87
1913-14	31·06	..	31·06
1914-15	31·79	..	31·79
1915-16	38·02	..	38·02
1916-17	30·28	..	30·28
1917-18	27·94	..	27·94
1918-19	32·18	..	32·18
1919-20	33·95	..	33·95
1920-21	49·44	..	49·44
1921-22	41·25	..	41·25
1922-23	45·27	..	45·27
1923-24	29·63	5·05	34·68
1924-25	15·61	4·26	19·87
1925-26	15·07	5·06	20·13
1926-27	12·64	3·93	16·57
1927-28	20·30	3·10	23·40
1928-29	27·55	..	27·55
1929-30	31·61	..	31·61
1930-31	27·10	..	27·10
1931-32	22·30	..	22·30
1932-33	30·65	..	30·65
1933-34	28·55	..	28·55
1934-35	35·85	..	35·85

(*d*) COST OF PRODUCTION.

The cost of production at Kharaghoda varies with the output. In 1925-26 it was Re. 0-5-5 per maund at 15 lakhs production ; with 30 lakhs it is about Re. 0-3-8. The issue price of Baragra salt is 0-4-3 per maund. Since 1929-30 the ' Agarias ' are paid Re. 0-2-3 per maund.

(*e*) SALES AND ISSUES.

When numerous salt works in Gujarat were closed and the work concentrated at Kharaghoda, it was feared that the price of salt would rise too high and so the Department appointed agents for the sale of Kharaghoda salts and opened depots in important centres like Surat and

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Ahmedabad. These agencies were established with the object of securing to the inhabitants of the district formerly served by the salt works which were suppressed the old facilities for obtaining their supplies and of protecting them against extortionate charges on the part of dealers and middlemen. The agents were required to sell Baragra salt at a fixed price which was the price at Kharaghoda *plus* transport charges. The agents were paid one per cent. on sales and one per cent. for wastage. But in 1904 the agents' monopoly was abolished and since then there is free trade and any trader can get salt from Kharaghoda. As many as 33 agencies are still in existence. Prices at agencies are fixed. Allowances to the agents were discontinued. The agents are Messrs. Nowrojee Peston Ji and Co. of Ahmedabad. The agencies sell at a fixed price which includes duty, cost price, transit charges, bagging and sewing charges, charges for the loan of empty bags and the agents' commission of Re. 0-1-0 per maund. The object of these depots is to supply the public with cheap salt at a uniform rate and to eliminate middleman's profit and speculation. Wholesale merchants are not debarred from purchasing salt in units of wagon loads.

The salt is issued direct from the stores or sold at the agencies. It is weighed out in bags of 3 maunds each in wagons which take 90 bags in case of metre gauge and 160 in case of broad gauge. On payment of the duty and price, the Manager issues a permit to weigh clerks to weigh the salt. 15 per cent. of the bags are test-weighed by a responsible official. All salt is issued in bags. There is a bag contractor for supplying new bags and sewing. He is paid fixed charges. The payment of duty and price can be made to :—

A. Salt treasuries, Bombay Presidency (1) The Chief Accounts Officer, Salt Department, Bombay. (2) The Manager, Main Salt Stores, Kharaghoda. (3) The Sarkarkun, Broach.

B. Other treasuries, etc. (*a*) Officers in charge of treasuries and sub-treasuries in the United Provinces, Central Provinces, Central India and Rajputana, (*b*) The Chief Treasury Officer, Ahmedabad, (*c*) Station Masters of certain Railway Stations on the B. B. and C. I. Railway.

(*f*) SELLING PRICE.

The selling price at the Main Stores is Rs. 1-13-6 per maund. This price is made up as follows :—

Cost price Re. 0-4-3, sewing charges Re. 0-0-3, Duty Rs. 1-9-0 (inclusive of surcharge of Re. 0-5-0).

Nearly all the Kharaghoda salt consumed within the Presidency is issued through agencies, as the retail dealers find it cheaper to buy salt from the agencies than by indent from Kharagodha. Bags are supplied by the agents at Kharaghoda to those purchasers who do not supply their own and a charge of one anna ten pies a maund which rate varies according to the market price of bags, is made for new bagging. At Ahmedabad, the Chief centre of distribution of Kharaghoda salt, the average market price is about Rs. 2-8-0 per maund.

(*g*) DISTRIBUTION.

The following statement shows the distribution of Kharaghoda salt from the year 1908-09 onwards.

In lakhs of maunds.

Year.	Bombay.	Central Provinces.	United Provinces.	Central India and Rajputana.	Total.
1908-09	5·27	6·19	10·93	4·35	26·74
1909-10	5·60	6·44	9·85	5·50	27·39
1910-11	5·71	6·69	10·23	4·92	27·55
1911-12	5·83	6·49	10·70	5·83	28·85
1912-13	5·94	6·31	10·00	5·30	27·55
1913-14	6·05	6·56	10·49	6·22	29·32
1914-15	6·66	5·94	11·31	4·44	28·35
1915-16	6·68	6·72	10·22	5·58	29·20
1916-17	6·26	6·29	15·63	4·72	32·90
1917-18	6·21	5·94	11·60	4·31	28·06
1918-19	7·19	7·84	13·14	5·49	33·66
1919-20	6·56	6·71	11·44	5·98	30·69
1920-21	6·81	5·84	13·83	4·44	30·92
1921-22	6·12	6·86	10·70	4·50	28·18
1922-23	7·39	7·50	5·12	6·00	26·01
1923-24	5·94	2·55	4·28	2·42	15·19
1924-25	7·53	8·28	10·19	4·99	30·98
1925-26	7·17	5·09	6·80	4·52	23·58
1926-27	7·35	5·80	7·37	4·56	25·08
1927-28	7·82	5·73	7·08	3·68	24·31
1928-29	8·09	5·67	7·61	4·81	26·18
1929-30	7·40	6·68	12·49	4·51	31·08
1930-31	7·67	6·06	7·35	4·43	25·51
1931-32	7·80	6·46	9·52	4·95	28·73
1932-33	7·43	5·93	8·27	4·43	26·06
1933-34	8·56	6·84	9·36	5·79	30·55
1934-35	7·37	5·73	7·92	3·57	24·59

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Kharaghoda, it will be seen, has a very steady market, the normal issue being 7½ lakhs to the Bombay Presidency, 6½ lakhs to the Central Provinces, where Kharaghoda salt is consumed side by side with sea salt as far as the borders of Chota Nagpur, 9½ lakhs to the United Provinces where Kharaghoda salt reaches as far as Hathras, Fyzabad and Benares and 5 lakhs to Central India and Rajputana. The only remarkable variations were in 1923-24 and 1924-25 due to the change in duty.

D.—SEA SALT.

Sea salt is manufactured within the Presidency. The salt works at Dharasna and Chharvada in Southern Gujerat coast near Bulsar are Government property, and worked under departmental control. Manufacture of sea salt in Dharasna is not controlled by Government to the same extent as Baragra salt in Kharaghoda, for at the former Government interference is restricted to the fixation of price. Government neither concern themselves with the manufacture, nor take it over after manufacture as they do at Kharaghoda. The other salt works with the exception of the Maroli, Shiroda and Sanikatta Salt Works which are situated in the Thana, Ratnagiri and Kanara districts respectively, are grouped within a radius of thirty miles of Bombay City. Each group of works forms a Taluka which is, as it were, a separate salt source. A Taluka is sub-divided into groups called sazas. The following is a list of the talukas :—

North of Bombay.

(1) Dharasna-Chharvada.
(2) Maroli.

Round Bombay.

(3) Bassein.
(4) Dadar.
(5) Belapur.
(6) Bhandup.
(7) Karanja.
(8) Rai.
(9) Trombay.
(10) Uran.
(11) Shewa.
(12) Pen.

South of Bombay.

(13) Shiroda.
(14) Sanikatta.

Only the works at Dharasna and Chharvada and a few works in other Talukas such as Bassein or Dadar are owned by Government ; the rest are all owned by private individuals. Some have been constructed on land wholly or partially alienated with or without quit rent (Inami salt works). Some are constructed by lessees at their own cost on land taken on lease from Government. Some of the salt works date back to the times of the 'Peshwas'. Those which are Government property are leased under tender system to private individuals for periods varying from one to five years. The rest are owned and worked privately. Private manufacturers have to take a licence from the Collector. No new work is opened, unless it is capable of giving an output of 5,000 maunds. Besides the duty and the lease money on leased works, Government charges from the licensee three pies on each maund of salt removed as ground rent. In a few Inami works no ground rent is charged.

(*a*) SYSTEM OF MANUFACTURE.

The manufacture of sea salt in Bombay Presidency is entirely a private industry carried on under licence. Salt is the property of manufacturers and price is fixed in open market between the seller and the buyer. The Salt Department sees that salt is kept in safe custody and collects duty on the salt removed. No licence fee or land revenue is levied. Only the duty at the rate in force and ground rent at three pies per maund are charged. The works are situated on creeks from which they are fed by a brine channel. The site is generally between the level of light water spring tides. The site is first surrounded by a strong embankment and the enclosed space divided into three divisions—the outer Reservoir (khajina) the inner Reservoir (Tapwoni) and the pan area (Khondyas). Great care is taken to make the bed of pans water-tight. Pans are formed by small clay partitions and a number of rectangular crystallizing beds—36 feet by 15 feet. The pans are about 50 feet to 60 feet by 15 feet or 20 feet in Dadar and in some places as big as 75 feet by 20 feet. The levels are so arranged that water flows by gravitation from the first reservoir to the second and from there into the pans. No lifting is required. This tends to reduce the cost of production. Sea water is admitted to the outer reservoir through a sluice at high tides and is then passed into the inner reservoir where it is allowed to concentrate by evaporation, until it is saturated. Pans are irrigated with this brine 1½ in. deep. This is allowed to evaporate and ¼ in. salt crust is formed. Salt is then raked to the edges of the pans and is allowed to drain. Fresh brine is admitted to the pans and the process repeated. Government does not exercise control over the process of manufacture and the licensees are free to manufacture any grade of salt they like. Ordinarily Bombay salt contains a little impurity, but it is superior to Madras salt. The kuppa or flake salt, a small quantity of which is also manufactured, is made in small pans 6 feet by 3 feet formed by dividing up a large pan by grass ropes. Wind action is minimized and pans are not raked or disturbed. Pure white flake salt is thus formed and is scraped every fourth day. The sea salt works vary greatly in size—small works are about 5-6 acres and the largest about 500 acres in area.

The average rainfall is about 80 in. and the working season lasts about 8 months. The soil is plastic and the humidity very high. Favourable winds blow which counteract the effect of humidity. There are dust storms in the Runn of Cutch. As single irrigation system is followed, some amount of dirt remains mixed with salt. Moreover, skilled labour is rather dear. The works have, however, the advantage of simplicity and absence of costly machinery and so the over-head charges are very low.

(*b*) STORAGE.

The salt of each work is stored separately in conical heaps, on earthen platforms after it is graded by passing through sieves. Four grades are usually sifted, though seven are recognised. The heaps are left uncovered but thatched just before rains break out. Each heap is numbered and the quantity estimated. The quantity in a heap varies from 120 to 600 maunds. Stock accounts are maintained. The practice of grading by sieves is peculiar to Bombay. This system is born of excise system and fostered by a system of sale by measure. Light Bombay salt thus competes with Madras salt in Salem and Coimbatore. The sifting is resorted to as a measure of sorting of various kinds of salt of uniform size to suit the taste of different customers. Consumers in Bombay Presidency like large grained grey salt. Ordinary Bombay sea salt is composed of small grains about $\frac{1}{8}$ in. diameter, but fine grained salt is reserved for export to Calcutta. A certain quantity of flake salt called ' kuppa ' is produced for market. This salt is very white and consequently popular among the upper classes.

(*c*) PRODUCTION.

The following statement shows the output of salt from the sea salt works from the year 1908-09 onwards :—

Year.	Production in lakhs of maunds.	Year.	Production in lakhs of maunds.
1908-09	97·84	1922-23	110·06
1909-10	91·11	1923-24	107·50
1910-11	96·08	1924-25	80·22
1911-12	102·75	1925-26	103·54
1912-13	108·56	1926-27	97·32
1913-14	95·78	1927-28	99·22
1914-15	107·86	1928-29	109·77
1915-16	92·21	1929-30	107·56
1916-17	89·35		
1917-18	85·35	1930-31	104·02
1918-19	133·70	1931-32	87·66
1919-20	91·09	1932-33	82·80
1920-21	90·72	1933-34	115·17
1921-22	79·19	1934-35	104·87

The sea salt works number about 400 and the area under salt cultivation is over 17,000 acres. The sea factories produce about 90-110 lakhs maunds of salt per annum, the average being about 95 lakhs. Big Talukas like Bassein, Shewa and Rai produce about 15-16 lakhs each, Talukas like Trombay, Dadar, Belapur and Uran produce about 8-9 lakhs each. The rest of the salt comes from other Talukas where the produce ranges from 1 to 5 lakhs.

(*d*) COST OF PRODUCTION.

At the sea factories the cost of production is unknown, as it is entirely in the hands of private individuals. In large well managed works it is probably about 2 annas a maund, but in ill-constructed or badly managed works it may be as high as five or six annas a maund. The cost price of salt as declared by the Shilotris in the applications for permits for removals of salt ranged from 2 to 8 annas. per maund in 1934-35.

(*e*) SALES AND ISSUES.

The sea factories are mostly owned by private individuals. So the purchaser has to make his own bargain with the manufacturers. The purchaser has to pay duty in cash at the Taluka office under the Sarkarkun or to the Chief Accounts Officer in Bombay or in any other authorised treasury. Credit system, as in Northern India, was in force under the Indian Salt Duties Act X of 1908, but was abolished in 1932. The Sarkarkun orders the salt to be weighed. All salt is issued in bags. Weighment is done on steel yards suspended from moveable bamboo tripods. Salt is weighed in one-maund, two-maund and two-and-a-half-maund bags. A permit is issued for the removal of salt. It is removed by sea or taken to wharves to be carried by rail. Each consignment has a route prescribed for it, and it is checked at a preventive station on the way where 15 per cent. of the bags are test-weighed. Transport from works to rail or boat is done by bullock cart or by light country boat. Retail salt is sold by measure. In Bombay City the measure in use is the 'palli' which is equal to 4½ Bombay seers of 28 tolas each. One Bengal maund is about 16 pallis of average salt.

(*f*) SELLING PRICE.

At the sea factories it is not possible to ascertain the selling price with any accuracy. The owners furnish returns, but naturally they do not want to make their transactions public and so the returns are not trustworthy. Salt of good quality sells at 6 to 8 annas a maund. At Dharasna-Chharvada where the price is fixed by Government the selling price is 5 annas 9 pies per maund. During 1934-35 the selling prices of salt removed to places above Ghats ranged from 4 to 7 annas. The prices include handling, freight and other incidental charges up to railway station from Salt Works.

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(*g*) DISTRIBUTION.

The following table shows the distribution of Bombay sea salt since 1908-09. Figures are given in lakhs of maunds :—

Year.	Central Provinces.	Central India.	Nizam's Dominions.	Calcutta.	Malabar.	Madras.	Travancore and Cochin.	Mysore.	Local.	Total.
1908-09	16·19	0·23	13·73	8·57	12·05	3·50	9·74	5·16	22·89	92·06
1909-10	15·61	0·13	13·27	9·20	13·08	4·49	7·76	5·81	22·53	92·06
1910-11	15·16	0·15	13·11	9·44	13·81	3·26	8·69	4·87	25·08	93·67
1911-12	16·28	0·27	14·17	8·34	14·71	3·82	7·59	5·49	26·91	97·58
1912-13	14·97	0·22	13·79	9·91	13·30	2·88	8·54	5·37	25·80	94·78
1913-14	14·93	0·23	14·56	9·02	12·99	2·61	5·97	5·18	27·26	92·75
1914-15	15·58	0·24	14·60	9·83	14·77	3·72	8·27	5·58	27·93	100·52
1915-16	18·02	0·27	15·16	5·86	15·18	5·72	7·21	5·95	27·21	100·58
1916-17	16·34	0·20	12·99	4·35	14·15	6·34	4·27	5·60	23·35	87·59
1917-18	21·99	0·49	13·05	5·54	13·16	2·95	4.56	4·55	22·16	88·45
1918-19	17·93	0·30	16·54	6·21	14·51	3·06	2·22	5·08	32·75	98·60
1919-20	15·91	0·09	13·24	8·23	11·67	4·01	4·55	4·10	28·19	89·99
1920-21	7·78	0·16	11·81	6·29	13·62	3·56	7·20	4·15	30·35	84·92
1921-22	6·58	0·15	12·97	6·77	10·74	3·11	4·34	4·84	31·00	80·50

Year.			Central Provinces.	Central India.	Nizam's Dominions.	Calcutta.	Malabar.	Madras.	Travancore and Cochin.	Mysore.	Local.	Total.
1922-23	..	..	16·95	0·11	13·56	7·35	13·89	2·72	6·12	6·60	28·02	95·32
1923-24	..	..	12·70	..	11·62	2·46	13·53	2·92	5–84	4·72	28·13	81·92
1924-25	..	..	16·34	..	14·67	9·94	15·74	2·81	5·74	6·60	32·17	104·04
1925-26	..	..	14·16	..	13·89	4·13	11·27	2·68	6·16	6·41	28·83	87·53
1926-27	..	..	16·78	..	15·02	6·46	15·23	2·92	5·44	6·09	27·63	95·57
1927-28	..	..	17·42	..	14·95	7·77	12·08	2·92	6·06	6·60	29·26	97·06
1928-29	..	..	17·54	..	14·97	6·01	14·28	2·84	5·65	7·21	30·12	98·62
1929-30	..	..	19·54	·29	12·50	6·55	12·46	3·61	6·24	5·97	29·35	96·51
1930-31	..	..	13·94	·60	16·03	6·17	13·02	3·39	4·70	5·98	29·19	93·02
1931-32	..	..	16·75	·14	16·03	9·63	13·87	5·08	5·51	6·73	28·12	101·86
1932-33	..	..	14·57	·18	14·50	3·58	12·25	3·65	2·91	7·02	30·03	88·69
1933-34	..	..	13·60	..	13·02	3·82	8·87	3·03	4·59	6·28	30·64	83·85
1934-35	..	..	12·54	..	13·49	5·09	12·73	3·34	5·76	5·49	27·72	86·16

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Bombay salt is consumed over a very large area. About two-thirds of the salt is consumed outside the Presidency. Its success in outside markets in competition with other salts is due to the intelligence and the enterprising spirit of the Bombay traders and the care and skill of the producers who themselves market the salt in many cases.

The total issues are practically constant, the average being about 30 lakhs for local consumption, 15½ lakhs for the Central Provinces, 14½ lakhs for the Dominions of His Exalted Highness the Nizam, 6 lakhs for Calcutta, 12 lakhs for Malabar, 3¾ lakhs for the Madras Ceded Districts, Coimbatore, Salem, and the Nilgiris, 4¾ lakhs for Travancore and Cochin and 6½ lakhs for Mysore. It is to be noticed that shortage in supply during the War affected Bombay's imports into Calcutta just as it affected foreign imports and that Bombay has had difficulty in recovering its old market there. It is interesting to observe that the restrictions placed on issues by the Madras Government in 1915-16 and 1916-17 had the direct and immediate result of increasing supplies from Bombay to Madras in those years. Supplies from Bombay to Travancore and Cochin have dropped in recent years owing to competition from Tuticorin. The large decrease in issues to the Central Provinces during 1920-21 and 1921-22 is said to be due to the tightness of the money market there and increased supplies from Sambhar. Bombay sea salt is probably consumed over a larger area than any other salt in India. In spite of certain disabilities, Bombay salt is able to hold its own in Madras owing to the prejudice of the people in favour of light salt manufactured in this Presidency.

E.—FOREIGN OR IMPORTED SALT.

A small quantity of English table salt (about 5,000 maunds) is imported every year. Besides, black salt is imported from Kathiawar. Total imports in 1933-34 and 1934-35 were 5,397 and 4,878 maunds respectively. Importation of unexcised salt from foreign Indian ports is restricted by the Transport of Salt Act under which salt not covered by a permit may not be carried along the western coast of India except in steamers over 300 tons burden. Since the termination of the Portuguese Treaty in 1892 substantial quantities have been imported every year from Goa. A Custom Line is established along the Goa Frontier and collecting stations are opened there. Imports are about 2-3 lakhs a year. This salt is consumed in the Belgaum and Dharwar Districts. This is subject to the additional Import Duty (0-1-6 per maund) and so the imports are steadily going down.

The imports from Goa since 1908-09 are given in the following statement :—

Year.	Quantity in lakhs of maunds.	Year.	Production in lakhs of maunds.
1908-09	3·55	1922-23	2·96
1909-10	4·02	1923-24	2·82
1910-11	3·59	1924-25	3·36
1911-12	3·55	1925-26	3·25
1912-13	3·35	1926-27	3·52
1913-14	3·41	1927-28	3·07

Year.	Quantity in lakhs of maunds.	Year.	Production in lakhs of maunds.
1914-15	3·39	1928-29	3·30
1915-16	5·53	1929-30	2·81
1916-17	3·92	1930-31	2·68
1917-18	3·48	1931-32	2·27
1918-19	2·25	1932-33	1·81
1919-20	3·58	1933-34	1·07
1920-21	2·56	1934-35	1·45
1921-22	2·64		

F.—BOMBAY-CALCUTTA SALT TRADE.

The question of the export of Bombay salt to Calcutta has engaged the attention of Government for a long time. In the fifties of the last century duty was required to be paid in Bombay. At Calcutta a drawback was allowed at Bombay rates up to the quantity manifested. No wastage allowance was allowed. Mr. Plowden in 1856 recommended export to Calcutta to be made free of duty. His argument was that Bengal was entitled to full duty at its own rate. Exports were made free from 1860. Discretionary authority was given to the Commissioner of Customs, Bombay, for the execution of bonds wherever he considered them necessary. The latest rules of 1927 require a certificate, showing the amount of salt supplied, to be produced before the officer-in-charge of the salt works, signed by the Collector of Customs, Bombay. Restrictions have been laid down with regard to the size of vessels transporting salt to guard against smuggling. The Transport of Salt Act, 1879, prescribed a minimum size of 300 tons. According to the latest rules of 1927 the minimum fixed is 1,000 tons. The removal of salt is also conditional upon the execution of a bond furnishing one surety or depositing Government promissory notes of a value sufficient to cover the duty *plus* possible depreciation in value. The bond is cancelled and security returned on production of a certificate from the Collector of Customs, Calcutta, as to the landing of the salt and the payment of duty on wastage in excess of 5 per cent., if any. The wastage allowance fixed at present (1936) is 5 per cent.

G.—PREVENTIVE MEASURES.

(*a*) KHARAGHODA.

A centralised store at Kharaghoda, Dharasna and Sanikatta is considered the best for preventing untaxed salt from passing out. The works at Kharaghoda and Udu are surrounded by guardposts and are constantly visited and patrolled. In the closed store the salt is under lock and key and the stores are only opened in the presence of a Superior Officer. The open stores over which a thick hard crust quickly forms can not be tampered with without immediate detection. The closed and open stores are guarded by armed sentries day and night.

2. Runn of Cutch.

In the Runn enough salt is formed naturally to supply the whole of India for many years, and this ‘ ghasia ’ salt was formerly generally consumed even in Malwa and Central India. There are also numerous

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natural deposits at a distance from the Runn while several of the States in Kathiawar have the right to manufacture salt. In order to shut out 'ghasia' salt and the salt manufactured in Kathiawar, a preventive line known as the 'Northern Frontier' line has been established which runs from the Luni river to the Bhogava river at the head of the Gulf of Cambay, a distance of 182 miles. At intervals of a mile there are guard houses occupied by four or five sepoys, and sowars are distributed along the line wherever their services are required. The line is divided into 9 beats, each in charge of an Inspector out of which 4 beats that are north of Kharaghoda are under the supervision of the Assistant Collector at Kharaghoda and 5 south of Kharaghoda under that of the Assistant Collector, Land Customs Line, Viramgam. Besides excluding contraband salt the line renders important services to the opium and customs revenue. The sanctioned strength of the force is as shown below :—

Foot Force—	
Jemadars	3
Havildars	10
Naiks	24
Peons	306
Total	343
Mounted Force—	
Resaldar Subedar	1
Farrier—Major	1
Duffadars	2
Lance-Duffadars	4
Sowars	35
Cemel Porters	5
Camel Sowars	1
Total	49

Isolated deposits within the line are guarded by detached parties and visited periodically by the Inspectors and the Assistant Collectors. Under the Bombay Salt Act, salt may not be sold within ten miles of the line except under a licence ; and the stocks and accounts of the licensees are frequently examined by officers of the department. By notifications under section 19 of the Sea Customs Act, the importation of salt by sea into the ports of Guzerat has been prohibited : for the shores of the Gulf of Cambay are full of intricate creeks and if the importation of salt by sea were permitted, it would be impossible to prevent its being smuggled on a larger scale from the coast of Kathiawar. The result of the measures described above is that, within a certain well defined area, Baragra salt is the only licit salt. If salt of any other description is found, it must necessarily be contraband.

The second tract is in the western part of the Jambusar Taluka in the Broach District and portion of Cambay State territory. Removal of salt was an offence before the Delhi Pact. From Broach downwards to Bhat-Kal there are salt ' kharis ' scattered all over the greater parts of the sea coast and are guarded by patrol parties. These ' kharis ' are considered salt works for the purpose of preventive rules.

(*b*) Sea factories.

The sea factories in Bombay are not fenced as similar factories in Madras, but in the year 1930 some of such factories in the Bombay Presidency had to be fenced with barbed wire as a measure of protection against the attacks of the civil resisters of the Salt Law. Almost all the remaining factories are surrounded by creeks full of water at high tides and soft mud at low tides. The salt is stored on platforms at each end of which is a sentry post. These posts are under the charge of the Inspector or Sarkarkun (pay Rs. 150—400). Under the Sarkarkun is the Sazedar, a non-gazetted officer on a pay of about Rs. 60 in charge of each saza or small manufacturing area. The sazedar keeps an account of all the salt heaps, noting the removals from each, and whenever a heap is opened, the open face is marked with red earth and stamped with a wooden stamp, so that salt cannot be removed without leaving traces. In addition to the sentry posts on the platforms, there is a special patrol whose duty is to move about constantly on a line outside the salt works, and to watch the roads and paths leading from them. This special patrol is under the control of the Daroga (pay Rs. 105—145) an officer who is quite independent of the factory staff and under the direct orders of the Assistant Collector (pay Rs. 300—1,000) in charge of the group of factories. At each post there is what is called a Kham Book in which every inspecting officer, *i.e.,* the Sarkarkun, the Daroga, the Sazedar, the Jemadar (pay Rs. 50) and the Havildar (pay Rs. 30) must sign and enter the time of his inspection. Each post is inspected three or four times each day and at least three times each night. On some nights the posts are visited five times. This Kham Book is chained to the post by a chain which is sealed at both ends. When salt is removed from the works under permit it must be taken to a preventive station where 15 per cent. of the bags are tested on platform scales. The preventive officer is usually stationed on a barge in the Bay outside the factory and he has under his control a patrol boat which moves about along the coast throughout the night. This preventive officer again is independent of the factory staff and works directly under the Assistant Collector. In the few factories from which land removals are permitted the preventive stations are well outside the works on the road by which the salt must pass. Outside the preventive stations there are Customs officers at the ports to which the salt must go if it is transported by water and Salt Department guards on the main roads to check the salt removed by land.

A preventive officer is usually stationed on a barge in the Bay outside the factory and he has under his control a patrol boat which moves about along the coast throughout the night. There are customs officers at the ports to which the salt has to go. When removed by land, the Salt Department guards the roads to the preventive stations to which the salt must go. Traffic in salt is regulated by the Transport of Salt Act. Smuggling from the Portuguese territory is prevented by a Customs Line around Daman and Goa.

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Special Rules regarding the prevention of illicit manufacture and sale of salt in the territories of His Highness the Gaekwar of Baroda exist. In the Baroda, Kadi and Narsari Divisions all manufacture of salt, all collection of salt from spontaneous production, all traffic in such salt and all possession of and traffic in salt which has evaded payment of the British duty is prohibited under penal provisions. There are similar arrangements with all Indian States which are given compensation for stoppage of illicit manufacture. The chiefs are also required to give all help and facilities to stop smuggling.

The number of offences detected in 1929-30, 1930-31, 1931-32, 1932-33, 1933-34 and 1934-35 was 141, 113, 33, 43, 42 and 62 respectively.

H.—HISTORY OF ADMINISTRATION.

Regular excise in Bombay dates back to about 1838. It was at that time in the hands of Collectors. The Salt Department was reorganised on the recommendations of Mr. W. G. Peddar in 1870 and a Collector of Salt Revenue was appointed as its Administrative Head. In 1882 the Collector was subordinated to the Commissioner of Salt, Excise and Customs. In 1917 the Salt and Excise Departments were amalgamated ; the Collector's appointment was abolished and three posts of Deputy Commissioners of Salt and Excise were created. Under the Reforms Scheme, 1920, salt became a Central subject, but Excise remained Provincial and so from 1924 Salt and Excise were again separated and the post of Collector of Salt Revenue again created. The Salt Department, however, remained under Bombay Government till 1925. From 1st January 1926 the Salt Law Amendment Act came into operation and the Central Board of Revenue took over direct control of the Bombay Salt Department. Up to 1st May 1932, the separate appointment of the Collector of Salt Revenue continued, when the Collector of Customs took over charge of the Salt Department in addition to his own duties. The post of a Deputy Collector of Salt Revenue was created from 1st May 1932. Thus at present the Collector of Customs, Bombay, is the *ex-officio* Collector of Salt Revenue, Bombay and the administration of the Department is conducted by him with the assistance of the Deputy Collector of Salt Revenue on Rs. 1,000—100—1,500. The Presidency is divided into 8 Ranges each under an Assistant Collector on Rs. 300—50—800—50—1,000.

The Ranges are Suigam, Kharaghoda, Viramgam, Surat, Thana, Ratnagiri, Kanara and Goa Frontier Ranges. The post of Assistant Collector of Salt Revenue, Suigam, was created recently for the Sind-Cutch Frontier in order to secure better control over movements of goods across that Frontier. This post, however, is temporary. In addition there is the Chief Accounts Officer and a Deputy Superintendent of Lighthouses at Bombay. The Assistant Collector at Kharaghoda exercises general supervision over the Factory, Stores and the northern section of the Frontier Preventive Line. The Stores are in the direct charge of a Manager aided by two Assistant Managers. The Factory is in charge of an Inspector who is responsible for the guarding establishment, allots pans to the agarias and supervises the manufacture of salt. The sea salt works are under the immediate supervision of the Assistant Collectors in whose Ranges they are situated. The establishment employed may be divided into two classes—that employed within the salt works themselves and the preventive establishment. Within the salt works each group forms a taluka in charge of a Sarkarkun (pay Rs. 150—400) with an office establishment and a number of weigh clerks. The taluka is divided into sazas in charge of officers known as sazedars (pay about Rs. 60). The sazadar keeps the accounts of the salt stored at and issued from each work and is responsible for all that goes on within his saza. Below the sazadars are Havildars (pay Rs. 30) and Jemadars (pay Rs. 50). Each saza has a considerable number of peons and petty officers guarding the salt. The preventive establishment is kept entirely separate from that employed in the factories and is not under the control of the Sarkarkun. It consists of Inspectors (pay Rs. 150—400) and Darogas (pay Rs. 70—100 or 105—145). These officers visit salt works continually to prevent and detect irregularities. Inspectors are also in charge of preventive stations and check the issues of salt after it has left the factories. There is also a Coast Guard Inspector who cruises in his boat along the coast up and down the creeks visiting salt works and preventive stations and examining vessels. The Customs House at Castle Rock is under a Customs Manager and the other Land Customs stations are under sarkarkuns or nakedars. One senior Inspector and 3 Junior Inspectors are stationed at Castle Rock for preventive purposes. The Goa Frontier Preventive Line is divided into 8 beats each in charge of an Inspector and the whole line is under the supervision of an Assistant Collector. A line has also been drawn round the Portuguese possession of Daman and 6 collecting stations have been opened there to prevent the importation of salt from the Portuguese works in Daman. The Daman frontier line is under the supervision of the Assistant Collector stationed at Surat.

The Bombay Salt Department also administers the sea and Land Customs Acts along the littoral of the Bombay Presidency proper, *i.e.*, from the head of the Gulf of Cambay to Bhatkal the extreme end of the Presidency and the Land Customs Frontier of (*i*) Viramgam (against Kathiawar), (*ii*) Daman and (*iii*) Goa. It also administers the Indian Ports Act, the Indian Merchant Shipping Act, the Indian Lighthouse Act, the Landing and Wharfage Fees Acts and the Vessels Registry Act at the various ports in the Bombay Presidency.

CHAPTER XIII.

Sind Salt Sources.

(*a*) HISTORICAL.

The existence of salt deposits in the desert of Sind and along the sea shore near Karachi has been known for a long time. The deposits have been mentioned in all the records since the British occupation. Mr. John Mcleod, Collector of Customs, Karachi, in his " Memorandum on the Pearl Banks, etc...........and the Salt Beds of Sind ", 1847, mentions that the existence of salt beds in the neighbourhood of the Ullah Bund was brought to the notice of Sir Charles Napier by Captain Baker, a Superintendent of Canals and Forests in a letter, dated 18th July 1844. Later on in 1847 Lt. Burke, R.E., Executive Engineer, P. W. D., Sind Division, in a letter to Major Peat, Superintending Engineer, Sind, invited his chief's attention to the possibility of salt, other than Cheshire sources, being in a more advantageous position to supply Bengal with salt. The sources in question were beds of salt in the Sind desert, one beginning about a mile eastward of Goonee, and after running for 15 miles terminating at Kotree ; another between Jufee and Sirgundah. He found the salt hard, crystalline and of very good quality. The dimensions of the bed, as estimated by Burke were 20 miles by 15 miles by 3 feet—mean workable thickness, *i.e.*, 929,280,000 cubic yards of contents or " 25,090,560,000 cubic feet of perhaps as pure bay salt as any in the Universe ". Taking the specific gravity of salt at 2.13, each cubic foot would weigh $132\frac{1}{2}$ lbs. and the produce of the whole bed 332,449,920,000 lbs. or about 1,500 millions of tons—an immense quantity. Later Captain Stanley Raikes, a Magistrate of the Thar and Parkar District wrote of the considerable revenue that was derived by the Zamindar of Veerawow from a salt lake (Mokye lake) situated close to his village. He mentions that this lake produced large quantities of salt which were exported. Mr. Plowden too in his report (1856) mentions about the salt sources in Sind and so does Lt.-Colonel Bruce in his " Salt Sources of India ". Sind also had peculiar natural advantages for the manufacture of salt by the process of solar evaporation. Solar salt was manufactured to some extent about 1875. Manufacture was spread over the districts of Karachi, Hyderabad, Sikharpur and the Upper Sind Frontier and excise duty on salt appears to have been levied at different rates. In Shikarpur and Upper Sind Frontier districts licence holders could make and remove certain specified quantities of salt at any time before 31st July 1878, on payment of excise at the rate of Re. 0-8-0 per maund.

About this time the Governor of Bombay visited Karachi and convened a meeting of certain district officers to discuss the means of enforceing an increased rate of salt duty, *i.e.*, Rs. 1-1-0 a maund (duty was raised in Bombay under the Government of India's orders). It was agreed that the salt works should be centralized and distribution should be made from the depots through a contractor. The choice of sources of supply lay on two places—the natural deposits at Sirgudah 70 miles and the Moach Plain 5 miles from Karachi. For economic reasons, the Moach Plain was selected and Mr. Maury was appointed to assist the Commissioner in Sind to work out the details of scheme. The works on the Moach Plain are now called " Maurypur " works after the founder's name.

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A separate source of supply was provided at the Mokhai lakes 72 miles from Diplo and 110 miles from Umerkot for the Thar Parkar District which was at a long distance from the Railway, but it is apparent that this scheme was not carried out ; for in 1879 two salt sources were established in the Thar Parkar district, *viz.*, Saran 5 miles from Diplo and a depot at Dilyar supplied with salt from the neighbouring deposits (Darwari) 20 miles from Dhoro Naro on the Jodhpur Railway. There were many other deposits such as Gaganwari, Shihanwaree, Khuhewari and others. Only Darwari and Saran are worked these days. The Department was fully organised and steps were also taken to stop removal of salt from such natural deposits.

In recent years, permission has been given to certain manufacturers to open private salt works in Karachi near Maurypur. The Star (now Gulbai) Salt Works, Grax, Limited, Salt Works, Nusserwanji Salt Works, Laxmi Salt Works and Eduljee Dinshaw Salt Works, have sprung up within the last few years and are manufacturing salt with a view to supply it to the Bengal Market. These are all, as it were, excise factories.

(*b*) ORIGIN.

Several theories have been put forward by different observers regarding the origin of the salt deposits in Sind.

As regards the deposits on the Runn of Cutch on the road from Lukpat northwards to Tatta Mr. Plowden in his report states, " In the opinion of Lt. Burke these fields have been formed by capillary attraction that is, the salt water with which the salt desert is saturated, has, by capillary attraction, been drawn to the surface and thereon crystallised by the rays of the sun. He also believes that the process of absorption of salt water from the sand and the process of crystallisation by the sun, are still going forward and that if the old bed were removed, the unassisted powers of nature would cause it to be rapidly or gradually renewed ". This view is in general agreement with what Mr. Dunn of the Geological Survey of India said of the Moach Plain salt works (Maurypur) as regards the presence of strong sub-soil brine from which the salt at these salt works is extracted. According to Dr. Cotter of the Geological Survey of India the percolating water dissolve any salts from the buried soil underlying the sand dunes and brings them into dhands where they get concentrated. This is also the view of the Salt Survey Committee who remark, " The initial formation of salt in these lakes would appear to be due to the fact that rain water which dissolves the soluble salts of the soil is concentrated in this area ". The shape of the dhands is most frequently an oval or elongate ellipse. They are as it were huge flat-bottomed evaporating pans.

R. B. Vinayak Rao, an officer of the Geological Survey, considered that there was little seepage in the Darwari valley and ascribed the origin of the deposit to the same causes as the formation of Sambhar (wind blown deposit). Mr. G. R. G. Shipp, Superintendent of Salt Revenue, Sind, has written a valuable note on the salt deposits of Sind. He has examined all previous records and made personal observations for some years. He thinks that the bulk of the wind blown salt comes to rest well away from the deposits in Sind. In many of the valleys no salt accumulates at all and no rivers flow into any of the deposits. He had samples of salt analysed and found magnesium chloride to be abundant in deposit salts. This led him to conclude that the deposit salt could not be windblown since according to the researches of Sir Thomas Holland and Dr. Christie windblown salt is free from magnesium chloride. Mr. Shipp also compared the analysis of various brines with that of the ocean. He says, "But on the whole, after weighing all the evidence available, I should prefer to ascribe the formation of the deposits to an original body of impounded sea water".

"Whatever be the causes of the formation of the salt deposits at Sambhar, Darwari and Saran, it is clear, they were not the same at all of them. Saran was probably due to an original body of sea water, with or without subsequent accretions by capillary attraction, Darwari, an original body of sea water *plus* accretions, in the past at least; and Sambhar mainly wind-blown salt".

(*c*) SOURCES.

Sind obtains its supplies from four sources. The principal source is at Maurypur situated on the Moach plains at the head of a creek about 8½ miles by road to the west of Karachi. Up to the year 1925, the greater part of Sind was supplied with salt by the Government Salt Works at Maurypur which produced on an average about 4 lakhs of maunds in a year. In November 1931 the Government Salt works were leased out to Messrs. Nusserwanji and Co., and are now run by them under the name of the Nusserwanji Salt Works. Four other private salt works have been, since 1925, permitted to manufacture salt for local supply and export to Calcutta and elsewhere :—

(1) Grax, Ltd., Salt Works.

(2) The Star Salt Manufacturing Co., now called Gulbai Salt Works.

(3) The Laxmi Salt Works, Ltd.

(4) The Edulji Dinshaw Salt Works.

(1) Grax, Limited, originally opened by Mr. Greenfield under the name of the Beacon Hill Salt Works, are now a Private Limited Liability Company. They produce salt of first class quality mainly for the Calcutta market.

(2) The Gulbai Salt Works formed by some lunaris (hereditary salt manufacturers) who broke away from the Government Salt Works in 1927-28, send regular shipments to Calcutta.

(3) The Laxmi Salt Works, Limited, owned by Messrs. Jaynarain Gaurishankar, were originally part of the Government Works. They commenced work in 1927-28. Their chief business is with Calcutta.

(4) The Edulji Dinshaw Salt Works are now producing lakhs of maunds chiefly for shipment to Calcutta.

The Government Salt works, now Nusserwanji Salt works, originally built by Mr. Maury in 1878 are still worked by the descendants of old salt manufacturers under the management of Messrs. Nusserwanji and Company.

The other two local sources are natural deposits in the desert portion of the Thar Parkar district. One is Darwari which is situated about 20 miles north of Dhoro Naro and 17 miles from Pithoro station on the

Jodhpur Railway. The other, Saran, is near the Runn of Cutch and is about 6 miles from Balhiari on the proposed Badin-Viramgam line which will connect Karachi to Bombay direct, and 56 miles from Badin Railway station on the Kotri-Badin Branch line of the North Western Railway. Saran, in normal times, only serves the villages in its immediate vicinity, as transport has to be done by camels or donkeys. It has been leased to Messrs. Edulji Dinshaw, one of the chief firms of Karachi. Dilyar was leased out to Messrs. Jotipershad and Co. in 1932 and now supplies Sind with about 50,000 maunds of salt per annum.

There are also numerous natural deposits of Salt along the coast between Karachi and the Runn of Cutch and in the desert to the north of the Runn but they are not worked.

The fourth source of supply is rock salt imported from Kalabagh on the Indus. This is usually imported by river and rail and is extensively used in Upper Sind. Small quantities of refined salt are also imported from Europe.

(*d*) SYSTEM OF MANUFACTURE.

(*i*) *Maurypur Salt Works.*

The area in which salt is at present being manufactured near Karachi is a strip of beach land forming one shore of a shallow creek. The beach is about 5 miles long and varies in width from 300 to 1,000 yards. The Beacon Hill—a long hillock about 70 acres in area—divides the beach into two roughly equal parts. Weather conditions at Karachi are very favourable to salt manufacture and Karachi has various natural advantages. Rainfall is very light ranging from 2 in. to 17 in. per annum. It occurs in July and August. Thus the working season is fairly long and evaporation goes on for about 300 days in the year. The soil which contains a high percentage of clay is impervious and thus suitable for salt cultivation. Brine is of high density and is directly irrigated into the pans. Grax Company have cement pans which are very useful for manufacturing a pure quality of salt. Sea breezes blow and are helpful to evaporation. The only trouble is that dust storms are rather frequent. An output of 90 tons per acre per annum is possible.

The old Government salt works (now leased out) cover an area of about 90 acres and are protected by a low embankment, stone pitched on the outside and three miles in circumference. The works are well arranged and compact. Manufacture is done by solar evaporation. The brine used is sub-soil brine obtained from wells 15 ft.—20 ft. deep. It is lifted in buckets on the weighted lever system. To maintain the supply of brine in these wells trenches connecting with a creek to the south have been dug around and across the works. Sea brine is admitted through sluices in these trenches during a high tide, since the pits are sunk on the foreshore between ordinary and high tide level. The pans have clay beds. Well brine having a density of about 15°B is baled out into pans which are irrigated to 3 in. to 6in. The salt is raked after each irrigation. The system of manufacture resembles the system in vogue at Kharaghoda for the manufacture of Baragra salt except that the accretions are not continued here for more than a week. The manufacture is on the single irrigation system. The manufacturers are called "Lunaris". Before the works were leased out they were required to take licences for the manufacture of salt. In 1931-32, 109 pans were licensed. The licensee had to sell the salt to Government at a fixed price as the 'agarias' do at Kharaghoda. The salt is clean, white and small-grained. After the salt has been scraped, it is washed in brine and put in small round heaps on the drying platforms. After drying for a week it is carried to the storage platform where it is weighed into store in trinangular heaps. The work of removal to heaps, weighment and storage was done on contract. Since 23rd November 1933 the Works have been leased to Messrs. Nusserwanjee and Co.

Since 1927 some private firms have got concessions and leases and have established salt works. The methods at different works differ to some extent.

Messrs. Grax, Limited, Salt Works make use partly of sub-soil and partly of sea brine. They have 6 miles of trenches 10 ft. wide and 4 ft. deep which drain to a pumping station. The pumps feed the brine to crystallizing pans. This old system of manufacturing salt from sub-soil brine is followed in a small portion of the Works only. Salt is mainly manufactured by the accretion system from brine condensed from sea water in surface condensers. Sea water from a separate trench is pumped into an area used for surface condensation. From the reservoir the brine is fed into the crystallizing pans which are 50 ft. × 35 ft. each having hard floors of tiles or cement. Salt is raked from the bottom of the pans by means of wooden rakes and after being washed in brine is stored in heaps of 200 to 300 maunds each on the platforms around the crystallizing pans.

The Gulbai Salt Works which are now worked by Messrs. Nusserwanji and Co. who purchased the old Star works at a public auction use mostly sub-soil brine and follow a similar method. Here the brine is pumped from the trenches by a wind mill or by an oil engine to a crannel which feeds it to a central reservoir from where it is distributed to crystallizing pans. The method of manufacture is practically the same as that formerly used by 'Lunaris' in Government Salt Works. As the supply of sub-soil brine diminished, the Company have also built a condenser for the supply of concentrated brine. A small crusher has also been installed.

The Luxmi Salt Works are the first and second extensions of the original Government Salt Works and have been leased to Messrs. Jaynarain, Gouri Shankar. They mostly depend on sub-soil brine from wells or trenches. The method of manufacture is the same as in Government salt works. They have also installed a pumping machine for supplying concentrated brine to a few large pans constructed by them which are being worked on the accretion system. The company has a crusher plant of small capacity and a light railway line leading to the Maurypur pier for transporting salt for shipment to Calcutta. The Eduljee Dinshaw Salt Works extend from the neighbourhood of the Grax Salt Works on the east and beyond the Luxmi Works on the west. The works consist of a series of condensers from which the brine is led by pipes into the crystallizing area a mile or more away. The crystallizing beds abut on the channel leading to the harbour where there is a boat basin to facilitate transport.

(*ii*) *Saran and Darwari.*

This second group of salt works is in the desert talukas where impounded brine has been lying between the sand dunes for centuries

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perhaps. Saran salt deposit is in Diplo, one of the desert talukas of Thar Parkar district, close to the Runn of Cutch and 56 miles south of Jhudo Railway station on the Mirpurkhas-Jhudo Branch of the Jodhpur Railway and about 60 miles from Badin Railway station on the Kotri-Badin Branch of the North Western Railway. It is about 6 miles from Balhiari on the proposed Badin-Varamgam line which will connect Karachi to Bombay direct.

The Darwari salt source is situated in the Khipro taluka of the Thar Parkar district—20 miles north of Dhoro Naro station. The country has all the features of the Sind desert—chains of sand ridges alternating with valleys in which shallow lakes of saline water are found. In Darwari, Gaganwari and Shingwari Saline lakes deposits of pure salt are formed. The salt gets firmly crystallized under brine varying from 1 in. to 3 in. The rain water which dissolves the soluble salts of the soil is concentrated in this area forming salt deposits. Darwari lake is about 1½ miles long and 200 yards wide. The sources were opened in 1879 and have yielded one to two lakhs maunds of salt annually. During War days in 1917-18 and 1918-19 Saran and Darwari produced 3.27 and 5.64 lakhs respectively. There are no facilities of transport. The salt has to be transported on camels to the depot at Dilyar, a distance of 6 miles. It is consumed in the neighbouring villages. The quality of salt is excellent. It contains over 99 per cent. sodium chloride.

At Saran the salt after excavation is dried for 7 days and then weighed and stored into heaps which are left uncovered on their outer surface. Salt becomes very hard and covered with a thick layer of dust. The heaps show small losses except when there are heavy rains.

Darwari has been leased out to Messrs. Joti Pershad and Co. and is now worked as a private concern. Saran has been leased out to Messrs. Eduljee Dinshaw, a leading firm of Karachi.

(e) PRODUCTION.

The following statement shows the quantity of salt produced in Sind ince 1907-1908 :—

Year.	Maurypur.	Saran and Dilyar.
	(In lakhs of	maunds).
1907-08	3·36	·64
1908-09	3·91	·44
1909-10	4·27	·62
1910-11	3·99	·37
1911-12	4·40	·77
1912-13	3·90	·61
1913-14	3·49	·47
1914-15	3·33	·53
1915-16	4·05	·91
1916-17	4·13	·71
1917-18	6·22	3·27
1918-19	8·60	5·65
1919-20	6·94	·33
1920-21	3·55	·09
1921-22	1·91	·55
1922-23	2·42	·23
1923-24	3·12	·17
1924-25	4·48	·31

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Year.		Maurypur.	Saran and Dilyar.
		(In lakhs of	maunds).
1925-26—			
Government Salt Works	3·29	3·74	·54
Sind Salt Chemical Works	·06		
Grax Limited, Salt Works	·39		
1926-27—			
Government Salt Works	3·75	4·73	·16
Grax Limited, Salt Works	0·98		
1927-28—			
Government Salt Works	2·78	5·46	·40
Grax Limited Salt Works	1·20		
Star Salt Works	1·41		
Laxmi Salt Works	0·07		
1928-29—			
Government Salt Works	1·93	7·73	·67
Grax Limited, Salt Works	1·80		
Star Salt Works	2·31		
Laxmi Salt Works	1·69		
1929-30—			
Government Salt Works	1·79	9·88	*Nil.* Deposit being under water owing to abnormal rainfall.
Grax Ltd., Salt Works	2·99		
Star Salt Works	2·70		
Laxmi Salt Works	2·40		
1930-31—			
Government Salt Works	1·56	8·13	·92
Grax Ltd., Salt Works	3·69		
Star Salt Works	1·63		
Laxmi Salt Works	1·25		
1931-32—			
Government Salt Works	1·27	11·93	·15
Grax Ltd., Salt Works	5·73		
Star Salt Works	1·13		
Laxmi Salt Works	3·18		
Nusserwanji Salt Works	·62		

Year.		Maurypur.	Saran and Dilyar.
		(In lakhs of	maunds).
1932-33—			
Government Salt Works	·76	13·43	·15
Grax Ltd., Salt Works	5·81		
Gulbai (formerly Star)	1·55		
Salt Works	..		
Luxmi Salt Works	3·43		
Nusserwanji Salt Works	1·88		
1933-34—			
Grax Ltd., Salt Works	5·72	13·03	·50
Gulbai (formerly Star) Salt Works ..	1·36		
Luxmi Salt Works	2·72		
Nusserwanji Salt Works	1·6		
Eduljee Dinshaw Salt Works	1·63		
1934-35—			
Grax Ltd., Salt Works	7·83	26·69	·75
Gulbai (formerly Star) Salt Works ..	3·05		
Luxmi Salt Works	3·15		
Nusserwanji Salt Works	2·29		
Eduljee Dinshaw Salt Works	10·37		
1935-36—			
Grax Ltd., Salt Works	7·65	27·96	1·5
Gulbai (formerly Star) Salt Works ..	4·43		
Luxmi Salt Works	2·48		
Nusserwanji Salt Works	2·33		
Eduljee Dinshaw Salt Works	11·07		

The variations in 1917-18 and 1918-19 were due to the demand from Northern India where supplies ran short and in recent years to manufacture of salt at the private salt works for the Bengal market.

The salt produced in the old Government salt works is mostly consumed in the local market. Formerly the transport was in the hands of a firm 'The Moon Company'—Now the works have been leased out. The output is about 1½ lakhs of maunds. During War days in 1917-18 and 1918-19 it rose to 6 and 8 lakhs respectively. They produced 2.33 lakhs of maunds in 1935-36.

The Gulbai salt works had an output of 1.41 lakhs of maunds in 1927-28 ; it rose to 2.70 lakhs in 1929-30. During 1931-32 it fell to 1.13 lakhs owing to dissensions amongst the partners in the firm, but again rose to 1.56 in 1932-33, 1.36 in 1933-34, 3.05 lakhs in 1934-35 and 4.43 lakhs in 1935-36.

The output of the Grax Limited, Salt Works was 1.19 lakhs in 1927-28. It has been rapidly rising till in 1935-36, it was 7.65 lakhs. The firm have a crushing plant and ship crushed salt. They use tip wagons to haul salt from the heaps to the crusher house at a distance of one and half miles.

The Luxmi Salt Works started about 1928. In 1929-30 they produced 24,000 maunds only. The output has been rapidly rising ; in 1934-35 it was 3.15 lakhs of maunds. They have also got a crusher plant. The Karachi sources have great natural advantages and possibilities of expansion. This matter has been discussed in the Chapter dealing with the potentialities of Indian Salt Sources.

(*f*) Cost of Production.

The cost of production of the Government owned salt at the Saran salt deposit is as follows. The excavation charges come to 5 pies per maund and storage charges to 2 pies per maund. To this establishment charges have got to be added. Taking these into account the cost of production at Saran is 3 annas 3 pies and the issue price at the Deposit is Rs. 1-12-3 Maurypur and Darwari salt is delivered at Rs. 1-14-0 per maund at Karachi and Dhoronaro Station respectively. This comprises Rs. 1-9-0 excise duty and Re. 0-5-0 cost of production and transport.

(*g*) System of Sales.

Indents for salt for local issue are accepted only on pre-payment of the duty (and cost price for Saran salt) in treasuries, but only the treasuries and sub-treasuries in Sind are authorised to accept indents. Bags are supplied by indenting merchants. Maurypur salt is conveyed from the works to Karachi on camels and is sold from there, being either delivered to traders in Karachi or consigned to mofussil dealers by rail. Up to 1928-29 transport was effected by a contractor who was selected by tender, the rate per maund for 1925-26 to 1928-29 varying from 1 anna 8 pies to 2 annas. Transport through Government agency ceased on the 31st March 1929. Since then the private salt works who supply the whole of the local demand, arrange their own transport. The minimum indent is for four maunds. There is no maximum, but the limit for any one indent is the capacity of a wagon, so as to give all dealers their turn.

The procedure for issues of salt has remained much the same since 1925-26. Transport to Calcutta is in bond.

At Saran salt is delivered to petty traders at the deposits.

(*h*) Selling price.

The issue prices at the Salt Works in Sind, including duty are at present Rs. 1-14-0 for Maurypur salt delivered at Karachi, Rs. 1-11-6 at Darwari Rs. 1-14-0 for Darwari salt delivered at Dhoro Naro, the nearest railway station and Rs. 1-12-3 at Saran. The wholesale selling price of Maurypur salt is Rs. 1-15-0 per maund at Karachi, Rs. 2-7-0 at Hyderabad, and Rs. 2-4-0 at Sukkur, the retail prices at these stations being Rs. 2-2-0, Rs. 2-8-0 and Rs. 2-8-0 respectively. Darwari and Saran salt sells in Thar Parkar at Rs. 2-10-0 wholesale and Rs. 3-2-0 retail. Rock salt is also on sale in Upper Sind, the wholesale price at Sukkur being Rs. 2-14-0 and retail price Rs. 3-2-0. At Jacobabad, in Upper Sind, Maurypur salt sells wholesale at Rs. 2-9-0 and Punjab salt at Rs. 3-8-0.

(*i*) ISSUES.

Long ago there used to be a Government depot at Sukkar for the sale of Maurypur salt. A system of licensed sale of salt existed. Licences were granted by the district Collectors, and only licensed vendors could sell salt. This system was then abolished.

Salt is now supplied direct at the various salt works and transport arrangements from the works to the market are made by salt indentors or the licensees of the works themselves.

About 4 to 5 lakhs of maunds of salt are issued for consumption in Sind, about 20-25 thousand maunds are issued to Khairpur Durbar and the balance exported to Calcutta.

(*j*) PREVENTIVE MEASURES.

No person is allowed to manufacture salt anywhere in Sind except in Karachi where it is allowed subject to certain conditions. The person wishing to manufacture salt has to take a licence from the Collector and to work according to its conditions. The factories are guarded by establishment. The guarding establishment at the various factories are as follows :—

	Havildar.	Naiks.	Peons.
Nuserwanji Salt Works	..	2	16
Grax Ltd., Salt Works	..	3	23
Gulbai Salt Works	..	3	9
Laxmi Salt Works	..	2	12
Edulji Dinshaw Salt Works	..	6	25
Saran Salt Works	..	..	4
Darwari Salt Works	..	1	5

The pans at all the salt works at Maurypur are surrounded by bunds 7 feet high which are patrolled day and night. The 3 salt sources in Sind are, however, in isolated situations and there is probably little danger of salt leaving the works without payment of duty. The great danger to the Salt Revenue in Sind is that arising from illicit removals of salt from natural deposits. The smuggling of salt into Sind from adjacent Indian States has ceased and cases of illicit manufacture by lixiviation of salt earth are unknown, but the task of preventing illicit removals from the numerous deposits near the coast and in the sparsely populated desert tracts is by no means a light one. Preventive measures at the Salt Works are in the hands of the salt establishment which consists of one Superintendent, 2 Inspectors, 8 Assistant Inspectors, and 111 petty officers and men. Outside the area of the salt works, the preventive staff of the Salt and Excise Department under the Superintendent of Salt and Excise in Sind and 2 Deputy Superintendents is responsible for the detection of salt crime.

The natural deposits are regularly patrolled. 60 offences against the Salt Act were detected in 1932-33, 55 in 1933-34 and 41 in 1934-35. Nearly all the cases related to possession of illicit salt, the total amount of such salt seized being about 287 maunds in 1932-33, 643 maunds in 1933-34 and 228 maunds in 1934-35.

(*k*) HISTORY OF ADMINISTRATION.

As previously stated, the Salt Department in Sind began its career about 1878 when the Maurypur salt works were started. At that time prevention of illicit manufacture and clandestine removal of salt from deposits was entrusted to the Police and Revenue Establishment. Originally the Collector of Salt Revenue was a separate post. Then it was considered proper to effect a saving by amalgamating this appointment with that of the Collector of Sea Customs. The amalgamation was effected in 1882 and the united Departments continued till 1908, when the Salt Department was separated from the Customs, was combined with the Excise and Opium Department and was placed under the charge of a separate Assistant Commissioner of Salt, Excise and Opium in Sind. In 1920 the designation was changed to Superintendent of Salt and Excise, Sind. He exercises all the powers vested in a Collector of Salt Revenue throughout Sind and is directly subordinate to the Revenue Commissioner for Sind. He advises all Collectors and Deputy Commissioners in Sind on all matters relating to the prevention of smuggling and illicit manufacture of salt.

The province is still divided into three Salt and Excise sub-divisions, two of which are in charge of Deputy Superintendents (pay Rs. 300—500) who are directly under the Superintendent of Salt and Excise in Sind and one under the Abkari Inspector, Karachi Town. Maurypur, owing to its rapid development, has been constituted into a separate jurisdiction since the 1st November 1929 and is now administered by the Superintendent of Salt Revenue under the Commissioner in Sind. In 1932 the two other Salt Works Dilyar and Saran were added to his charge. Under the Deputy Superintendents there are 16 Inspectors on the scale of pay of Rs. 150—300, 25 Assistant Inspectors on Rs. 25—35, 54 Sowars on Rs. 20—25, 12 Naiks on Rs. 22—25 and 79 peons on Rs. 16—18. The expenditure on the combined establishment is shared by the Central and the Local Governments in the proportion of 1 : 3 but in the case of the Superintendent of Salt Revenue for Sind and his staff, consisting of 5 Assistant Inspectors, 35 petty officers and others in charge of the private salt works, the expenditure is debited to "5—Salt" except in respect of one quarter of the pay and allowance of the Superintendent of Salt Revenue which is debited to the Bombay Government on account of this officer's responsibilities as Accounts Officer for the Combined Salt and Excise Department. Thus the working of the Salt Department in Sind is divided into two sections. The Superintendent of Salt Revenue for Sind controls the manufacture and disposal of salt throughout Sind and the Superintendent of Salt and Excise sees to the prevention of breaches of salt laws.

The salt sources at Maurypur and Darwari are each under an Inspector who is responsible for the correct weighment and issue of salt. The Saran Salt Deposit is under an Assistant Inspector who has in addition to supervise the excavation of salt.

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CHAPTER XIV.

Salt Sources in Indian States and Aden.

A.—OKHA SALT WORKS.

(*a*) HISTORICAL.

Salt has been manufactured in Kathiawar and Baroda from times immemorial. Before the British, the 'Peshwas' exercised the right of levying duty on salt. It was under the treaty of Bassein in 1817 that the British Government succeeded to the exclusive right of the Peshawas to the salt works in Gujarat. About 1853 the Gaekwar instituted a vigorous agitation to establish salt works and open ports on the coast within his own territory. The Government of India contended that such rights had never been exercised by the 'Peshawas' and declined to admit any such privilege claimed by the Gaekwar. About 1870 Government adopted the policy of concentration of manufacture of salt in certain areas where it could be economically manufactured and conveniently guarded. Government also wanted to stop smuggling into British territory of salt produced in the Kathiawar Peninsula and within the borders of the remaining Indian States. So treaties and agreements were entered into with the various Indian States. Agreement with Baroda was entered into in 1887. Under this, the Baroda Durbar agreed to make or collect only as much salt in its Kathiawar possessions as was sufficient for local consumption and for export to places outside India including Indian States and foreign settlements in India. The Baroda Government also agreed to observe Bombay Government Rules of 1903 for the more effectual prevention of illicit manufacture and collection of, and contraband traffic in salt in His Highness's territories in Baroda, Kadi, etc.

In 1919 the Baroda Durbar again put forward their claims to manufacture and supply salt to Bengal and Burma to replace imported salt and also to produce various by-products from bitterns. This request was granted under certain safeguards and the Baroda Government was permitted to export to Bengal and Burma sea salt produced at Okhamandal and Kodinar situated in its territory in Kathiawar. This export is permitted in vessels of not less than 300 tons burden and the vessels are not allowed to call at any intermediate port. Export from Baroda to foreign countries is permitted without any limit of tonnage. According to the agreement, the Durbar can open new sources with the consent of the British Government only ; the Maharaja is expected to prevent export of salt to British territory and limit its consumption to his own State and to permit Government officers to inspect the works.

(*b*) SITUATION AND CLIMATIC CONDITIONS.

The works are situated 12 miles north of Dwarka and 7 miles south of Port Okha in the Okhamandal Sub-Division of the Baroda State. The works have been named Mithapur. The climatic conditions are very well suited to the manufacture of salt. The average annual rainfall is 12 in.—13 in. only. The working season lasts for 8-9 months. The conditions of temperature, etc., and wind velocity are also favourable, though humidity is a bit higher than that of Karachi. There is, however, the trouble given by dust storms. The soil is calcareous and so brine percolates through it. The Salt Survey Committee considered that the average output could be 70—75 tons per acre.

The present firm have obtained from the Baroda State concessions which give them an exclusive right of manufacturing salt in all the saliferous tracts in Okhamandal for 30 years. The State recover royalties and taxes amounting to annas 10 per ton.

(*c*) Manufacture.

The works are situated very favourably as regards collection of brine. It has been possible to impound brine covering an area of over 500 acres with a simple dam. The layout of the works is divided mainly into (1) Marine Lakes—outer and inner (Sagar), (2) Reservoir (Talao), (3) Lagoons (Dharappa), (4) Storage tanks (Khajano), (5) Condensers and Ponds (Tapavani), (6) Feed tank (Gamda), (7) First set of pans (kyars), (8) Circulating Tank (Havada), (9) Spraying Basin (Agasi), (10) Second set of pans, (11) Power House and (12) Mills. The sea water enters the outer marine lake twice a day at tide times and flows by gravity towards the inner marine lake, passing through the automatic gates which open and shut with the advancing or receding tides impounding during the tide times the maximum of sea water. The gradual evaporation of the sea water begins in the inner marine lake which is about one mile long. From the inner marine lake the sea water passes by gravity into a larger reservoir covering about 100 acres from which the further concentrated waters again pass by gravity through a long channel into a huge lagoon about a mile long. In this lagoon the density of the sea water is brought up to a high degree of concentration. The brine from the lagoon is made to pass into the storage tank which is about 90 acres in area. The flow of brine from the storage tank into the four condensers is regulated by turnover sluices. The concentrated brine passing through the condensers takes a zigzag course, till it is nearly saturated. Finally the brine is led over very shallow surfaces called ponds and then delivered to the pumping stations. Nine-tenths of the sea water which entered the marine lake from the sea by going over a passage of four miles has been evaporated by solar agency before it arrived at the pumping station. The saturated brine is lifted up by pumps specially designed for handling saturated brine and delivered into the Feed Tank. From the Feed Tank it is led over the first set of pans made of asphalt surfaces. The saturated brine passing over these *kyars* deposits part of the salt it contains and then enters the Circulating Tank equipped with a powerful specially designed pumping plant. The saturated brine is sprayed through several nozzles. The brine then flows from the 'Agasi' at great velocity into the second set of pans also made of asphalt surfaces. The salt deposits over these surfaces and the clear supernatent brine flows back into the Circulating Tank again to be picked up by the powerful pumps and re-circulated till it has given up very nearly its entire quantity of dissolved salt. The object of the firm in erecting the spraying plant is to recover magnesium chloride from the spent up brine or bitterns. The accretion system of manufacture is followed and the crop is allowed to grow to a thickness of 2 in. to 4 in. Brine is admitted to the pans at 24°B and is not allowed to rise up 29°B—so that the salt deposited is free from impurities. The salt is lifted from the pans and carried in tip wagons to the platform near which a crushing plant is installed. The dry salt is crushed.

(*d*) OUTPUT.

Salt both crushed and uncrushed is loaded into wagons which are shunted into the works on the metre-gauge siding. The wagons are transported to Port Okha seven miles distant from the works. There the wagons run on to the pier where steamers of 12-13 thousand tonnage can anchor.

The area under cultivation is over 1,100 acres. The output during 1929-30 was about 130,000 maunds. It has gradually risen till in 1934-35 it was over 1,700,000 maunds. The works have a great many natural advantages (1) the sub-marine lakes concentrate the brine and convey it to works by gravity only, (2) the spraying process helps to concentrate the brine quickly, (3) it has facilities of transport and direct shipping is possible at port Okha and it is possible to dispense with the use of lighters for the loading of ships, (4) the climatic conditions are favourable and the cost of manufacture is not very high, (5) the salt produced is of good quality.

The Tariff Board considered this source capable of supplying 60,000 tons (about 1,700,000 maunds) per annum to Calcutta market. The source has thus great possibilities of expansion. This matter will be discussed in detail in the chapter dealing with the potentialities of Indian salt sources.

B.—MORVI SALT WORKS.

(*a*) HISTORICAL.

It was in 1883 that agreements were taken from the Chiefs of Kathiawar for the regulation of the manufacture of and the trade in salt. The first was executed by the six Chiefs of maritime and salt producing States, *viz.*, Junagarh, Nava Nagar, Morvi, Jafrabad and Porbandar. It was in pursuance of the policy mentioned with reference to Okha Salt Works. In 1919 Morvi and other maritime Durbars put forward their claims like Baroda to manufacture and supply salt to Bengal and Burma to oust imported salt. Their requests were granted under the same safeguards. Morvi, Bhavnagar and Navanagar Durbars were given permission under Government of India's orders in 1928.

(*b*) SITUATION AND CLIMATIC CONDITIONS.

The Morvi Salt Works are situated near a small village called Dhasi (now named Lavanpur), some 22 miles north of Morvi, the Capital of Morvi State, and 7 miles south of Port Navalakhi. The area of the works is about 600-700 acres. The climatic conditions are less favourable than at Okha. The rainfall is about 18 in. and the working season about 7-8 months. Humidity is rather high 70 per cent. and wind velocity 7 to 8 miles an hour. The soil consists of an impervious but soft clay. Dust storms too occur in April and May and are liable to spoil the quality of salt. The State has leased the works out to a manufacturing firm at a royalty of annas 8 a ton. The terms of the lease are subject to revision at the end of five years.

(*c*) MANUFACTURE.

Manufacture of salt is by solar evaporation only. The works have natural advantages like Okha as regards initial supply of brine. The differences in levels, the contour of the country and existing bunds are used to secure flow of brine by gravity. Pumping is required only in the last stage of manufacture. Brine is admitted from the creek to the outer reservoir through automatic gates fitted in a bund which impounds the high tide flood. From the outer reservoir the brine flows zig-zag through the intermediate condensers. A high density of 23° is attained in the last of these condensers and brine is pumped to the storage-pans from where it flows by gravity to crystallizing pans of 300 ft. by 100 ft. size. The pans are of clay and the floor is made impervious by tamping. The accretion system of manufacture is in vogue. The salt collected from the pans is heaped up on platforms alongside these pans and is then loaded into tipping trucks running on a 2 ft. gauge to the storage heap which is situated along-side the Railway line. The salt is loaded from the storage heap into wagons running on 2½ ft. gauge line and is transported from Lavanpur to Port Navalakhi—a distance of 7 miles. It is stored in the wharf and loaded into steel barges lined with wood. Salt from the barges is loaded into ships. Attempts are being made by shipping companies to bring their ships in Port Navalakhi and take salt direct.

(*d*) OUTPUT.

The output in 1930 was about 140,000 maunds only. It has since been increasing. In 1934-35 it was about 500,000 maunds. The Salt Survey Committee considered the source capable of supplying 40,000 tons or about 11-12 lakhs of maunds. The salt is exported to the Bengal market. The source has great potentialities. The matter will be considered in the Chapter dealing with the potentialities of the Indian Salt Sources.

C.—OTHER STATES.

Navanagar, Bhavnagar and Porbandar States have been permitted to export sea salt to Bengal and foreign countries. The salt works in Navanagar and Bhavnagar are more or less in an experimental stage, but those in Porbandar have much developed. Porbandar produced and exported about a lakh of maunds to Calcutta in 1932-33. Output has been rapidly rising. In 1934-35 Porbandar produced over 6 lakhs and exported it to Calcutta.

D.—SALT WORKS IN ADEN.

It will not be out of place to give a note on Salt Works in Aden. Aden has so far been under the Indian Government for administrative purposes. Aden salt was exempted from the operation of the Salt (Additional Import Duty) Act 1931, as Aden was treated as part of India. During recent years Aden has been the biggest supplier to Bengal market.

(*a*) CLIMATIC CONDITIONS.

Aden has a great many natural advantages for manufacture of salt. It has very little rainfall and practically the whole year is open for manufacture. Temperature is high and uniform. Strong winds blow throughout the year and afford great assistance to the process of crystallization and at the same time enhance the rate of evaporation. The initial density of brine is frequently above the average density of sea water owing to the shallow nature of the lagoons. The soil consists of a hard stiff clay which forms an impervious bed for the crystallizing pans. Shipping facilities are good.

(*b*) MANUFACTURE.

Brine is admitted through sluice gates direct from the sea or lagoon. Condensation is secured in the case of the Aden Salt Works partly by a system of submarine lakes, and partly by condensers. In the case of other works the brine passes through a series of condensers (generally three) until it passes into the storage tank at a density of 21-22° Baume. The brine is generally pumped into the condensers, oil engines (assisted in the case of the Aden Works by windmills) being employed. From the storage tanks the brine is admitted into the crystallizing pans as required. The accretion system of irrigation is employed, pans being worked on a two months' rotation. Great care is taken to test the density of the brine daily both in the condensers and the crystallizing pans. In the latter the density is never permitted to exceed 29° Baume. When that stage is reached, additional brine is admitted from the storage tanks. At the end of two months the crust of salt is broken up by hand with sharp spades specially designed for the purpose. Care is taken to leave approximately one inch of salt in the pan. This ensures that all the salt collected is clean and white. Salt is collected in heaps and allowed to dry. It is then stacked or removed to the mills to be crushed. Each works is provided with a very complete system of tramways enabling the salt to be transported rapidly and economically. Discharge into the barges for shipping is as a rule by hand, though at the Aden Salt Works conveyer belts are employed. Great care is taken in manufacture. The accretion system employed tends to decrease labour costs while, as there is little or no rain, the risk of having the whole crop destroyed which prevents the adoption of this system in many parts of India is inconsiderable. Finally the adoption of a system of rotation ensures regular deliveries throughout the year. The lay-out is excellent and well planned with a view to facilitating transport.

There are four different works (1) Aden Salt Works, (2) Indo-Aden Salt Works, (3) Hajeebhoy Salt Works and (4) Little Aden Salt Works. The total area of all the works is over 4,000 acres and according to the Tariff Board they could supply 180,000 tons to the Bengal market. As a matter of fact in 1933-34 and 1934-35 Aden supplied 7,683,657 and 7,251,657 maunds to Bengal (much more than the Tariff Board's figure) besides supplying 194,544 and 381,593 maunds respectively to Burma. The works have greatly expanded during the last 3 or 4 years since Aden salt enjoyed the shelter of the Salt (Additional Import Duty) Act, 1931.

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CHAPTER XV.

Burma Salt Sources.

(*a*) HISTORICAL.

Salt has been manufactured in Burma by boiling brine as a cottage industry from times immemorial. Local manufacture went on in most of the littoral areas in the Arakan, Irrawady, Pegu and Tenasserim Divisions. In the Arakan Division it was manufactured in the Aeng Township and Island of Ramree. In the Irrawady Division Bassein and Myaungmya Districts were the chief centres of manufacture. In the Pegu Division large areas on the banks of the Sittang estuary provided saline earth for the manufacture of salt, while in the Tenasserim Division the Districts of Amherst, Thaton, Tavoy and Mergui produced salt from brine concentrated in the numerous creeks. It was obtained by the combined process of solar evaporation and boiling. Shallow pans were made in the hard clayey banks of the tidal creeks ; brine was concentrated in these and was then run off to a well where all impurities got precipitated :—clarified brine was then boiled and salt obtained. According to Mr. Plowden in 1854 kilns containing 16,600 and 40,000 pots were worked respectively in Bassein and Rangoon. About 1832 Government established salt Golahs at Kyaukpyu in Arakan. Salt was purchased from the manufacturers and transported to Chittagong. In those days, the manufacture and sale of salt was absolutely free but subject to an excise levied in the shape of a licence of 4 annas on every earthen pot and Re. 1 per iron boiler employed in manufacture. These rates varied from district to district.

Prior to the passing of the Indian Salt Act, 1882, Salt Administration in Burma had been controlled under the Lower Burma Land and Revenue Act, 1876, section 39 of which authorised the Chief Commissioner to make rules :—

(*a*) for granting licences to manufacture salt ;

(*b*) for imposing on all salt manufactured a duty at a rate not exceeding the rate of customs duty for the time payable on salt imported by sea ; and

(*c*) for compounding with any holder of a licence for the payment by him of an annual sum assessed upon the plant employed by him in lieu of the duty which would be payable by him on the salt produced with the aid of such plant.

The rules made under this section in 1879 provided—

(1) that on salt manufactured in British Burma an excise duty should be levied at the rate on which customs duty was for the time levied on salt imported by sea ;

(2) that in lieu of the above mentioned duty an annual sum should be assessed upon the pots or cauldrons used in the manufacture at a rate not exceeding Re. 1 per pot and Rs. 5 per cauldron.

The customs duty applicable at the time had been 3 annas per maund levied under the Indian Tariff Act, 1875. The same duty was levied on local salt and the composition rates varied from 2 annas to 12 annas per earthen pot and from Re. 1 to Rs. 5 per iron cauldron. In 1882, section

39 of the Burma Land and Revenue Act, 1876, was repealed by the Indian Salt Act, and the Government of India, Finance and Commerce Department's Notification No. 751, dated 28th April 1882, provided that an excise duty of three annas per maund should be levied on salt manufactured in British Burma. In January 1888, the import duty and the excise duty were both raised to Re. 1 per maund, but no immediate change was made in the composition rates. They were slightly increased in July 1888, but in the meantime there had been a serious decline in the importation of foreign salt. In 1889, Mr. F. Ashton of the Northern India Salt Revenue Department was deputed to Burma to inquire into the cause of the falling off in the consumption of imported salt and the prospects of recovery and to report on the best means of regulating the local manufacture of salt. Mr. Ashton reported that the local industry had expanded owing to low assessment and he recommended its complete suppression preceded by partial suppression, manufacture being allowed for a time in Arakan and Tenasserim and prohibited elsewhere. Curiously enough he reported that no establishment would be required to carry out this policy of suppression. The Chief Commissioner agreed with Mr. Ashton in thinking that the end to be aimed at was the suppression of the local manufacture, but in view of the state of the province at that time, he thought that it was not advisable to attempt this by the enforcement of a prohibitive order. He wrote " It is best to proceed gradually by raising the duty, a course which will have the effect both of raising the revenue and of preventing the growth of the industry ". This view was accepted by the Government of India and revised rates of composition duty were imposed with effect from the 1st July 1890. In April 1895, the Financial Commissioner submitted a comprehensive note containing his remarks and suggestions relative to the salt industry and its taxation in Lower Burma. He reported that importations of foreign salt had declined and that local salt had been brought to Rangoon and Bassein for the first time and he concluded that the rates of composition duty were inadequate and that a great deal of illicit salt was manufactured. He proposed—

(*a*) where the manufacture of salt in any district is of small account, to prohibit manufacture altogether ;

(*b*) if possible, to restrict the licensed pots or cauldrons to one uniform capacity throughout the province ;

(*c*) to restrict the places where salt may be made to certain specified localities in any district within well-defined limits ; and

(*d*) to raise the composition rate on pots or cauldrons to such a figure as will adequately tax the ascertained production of those factories where working goes on steadily and continuously and at full or nearly full capacity.

These proposals were generally accepted. Manufacture was prohibited in Pegu and Thongwa districts from 1st January 1897 and a standard capacity of five gallons was laid down for earthen pots and 40 gallons for iron cauldrons. Manufacture was limited to specified *kwins* in a few circles of the salt manufacturing districts and considerable enhancements were effected in the rates of composition duty. In the course of the correspondence the Government of India remarked " that they observe with satisfaction that the Chief Commissioner considers that less weight may now be given to political considerations which have hitherto prevented the adoption of methods for the prohibition of the manufacture of salt in districts where manufacture is unimportant, for restricting it in other districts to a few specified and defined localities, for fixing as far as possible a uniform capacity for licensed pots and cauldrons throughout the province and for adequately taxing the outturn ". Later, the action taken was reported to the Government of India who replied quoting statistics and giving reasons in support of the view that " there has been an extensive displacement of imported by local salt and that under present arrangements this involves a considerable and growing loss of revenue, the taxation on the locally manufactured article being far below the Re. 1 a maund which the imported salt pays ". In the meantime the Financial Commissioner had reported that the increase in the rates of duty had had the effect of increasing manufacture by iron cauldrons in preference to earthen pots, had resulted in a larger outturn per pot or cauldron and had extended the period of manufacture. He, therefore, recommended a further general enhancement of the rates of composition duty. These were notified with effect from 1st January 1898. In 1899, Sir Frederick Fryer proposed that the system of direct taxation on outturn at 10 annas a maund should be tried in one or two districts such as Bassein and Hanthawaddy where concentration of manufacture had been effected. The Government of India did not object to the direct taxation on outturn, but ordered that the duty to be imposed should be 12 annas a maund. They further ordered an increase of 25 per cent. in the composition rates and suggested further concentration including suppression of manufacture in certain districts. Effect was not given to the orders for the introduction of direct taxation on output in the Bassein and Hanthawaddy districts until the 1st January 1902. The rate imposed was Rs. 3-2-0 per 100 viss which was slightly less than the rate of 12 annas a maund approved by the Government of India. The Hanthawaddy and Bassein salt boilers, however, were unwilling to take out licences under the new system, and orders were obtained reducing the duty to 8 annas a maund for the first year. In forwarding the memorial submitted by the salt boilers to the Government of India the views of the Local Government were expressed as follows :

> " It is understood that further concessions cannot be made and His Honour the Lieutenant-Governor, therefore, considers that your memorialists must be left to find other occupations. While fully alive to the hardship involved in the break up of this industry, Sir Frederick Fryer realises that nothing more can be done in view of the decision that these salt boilers must pay duty at a rate approximating to the import duty. It is probable that they will take up agriculture in place of their present occupations. Salt works were at one time much more extensive than they are now, but many of them have been closed from time to time as composition rates were raised. The people who then gave up salt boiling turned to agriculture and the present memorialists will need to do the same. His Honour regrets the necessity for this, but is unable to see how it can be avoided in view of the policy adopted by Government ".

In reply the Government of India urged the renewal of efforts to introduce the new system but added that if the Local Government was of opinion that a further reduction of duty to 6 annas a maund would be

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suitable for acceptance at the start the Government of India would agree to this rate. Meanwhile the Bassein salt boilers had started work with the duty of 8 annas a maund. The Hanthawaddy manufacturers followed suit and the new system was gradually extended to the districts of Myaungmya, Tavoy, Amherst and Kyaukpyu. The working of the new system caused much dissatisfaction and in 1906 the Financial Commissioner submitted a report discussing the objections to the new system. On receipt of this report the Local Government addressed the Government of India proposing that an officer of the Burma Commission together with an officer of an Indian Salt Department should be deputed to enquire into and report on the conditions of the salt industry in Burma. The officers selected were Messrs. J. B. Wingate, I.C.S., and R. M. Thurley of the Madras Salt Department. In their report submitted in 1908 they recommended that complete suppression of the local industry would be best for the country at large and that this policy should be kept steadily in view. Compulsory suppression after due notice was recommended for Pegu and Irrawaddy divisions ; and unless good cause was shown to the contrary, for the less important Upper Burma districts. In the Tenasserim division a gradual enhancement of rates to 12 annas a maund and compulsory closing of the remote works was suggested, while for Kyaukpyu district they advised a gradual enhancement of rates without compulsory closing. Enhancement of rates was not recommended for the districts under the composition system. Finally it was suggested that the policy of gradual restriction by limiting the grant of new licences should be made more stringent and applied to all salt producing districts in Burma. These recommendations were accepted and in 1909 Government declared their general policy to be (1) suppression of manufacture where it is of slight proportions and its concentration wherever it is continued, and (2) enhancement of duty with a view to bringing it to the same level as the duty imposed on foreign salt. The excise duty was accordingly raised to 12 annas a maund with effect from the 1st January 1914. After this war conditions prevailed. Advantage was taken of the heavy demand for local salt to raise the excise duty to Re. 1 per maund in 1916 and to Rs. 1-4-0, *i.e.*, the same duty as was imposed on foreign salt, in 1917. The fact that during the war period and for some years afterwards the province had been able to produce a large proportion of its requirements paying duty at the same rate as the duty imposed on the foreign article, considerably altered the outlook of Government and various measures for the encouragement of the local industry were taken from 1918 onwards. In particular during 1919-20 an experimental saltern of the Madras type was worked in the Amherst district at a cost of over Rs. 24,000. This factory demonstrated that Burma could produce a very high grade of solar salt at a cost comparing favourably with the cost of manufacture in India, but at the same time it was found that the Burmese had no taste for this large grained solar salt, no matter how pure it might be. The experiment was, therefore, abandoned and efforts were concentrated upon the introduction of economies and improved methods of working in the existing factories. Government, however, later on established a salt factory at Kyaukpyu in 1924-25 to demonstrate the methods of production which, while not foreign to the local salt boiler, were far more economical than the methods he had hitherto employed. Thus the local salt boiler had an opportunity of benefiting by the example set by Government and has made improvements to some extent. In this factory magnesium salts were separated by drawing salt from the pans as soon as the sodium chloride had deposited. The factory was closed down in March 1934. The position at the end of 1929-30 was that the local industry had lost all ground gained during the War. The consumption of locally produced Direct Duty salt had dropped from 59.14 per cent. of the total consumption of the province in 1919-20 to 16.92 per cent. in 1929-30.

The duty in Burma has since the War followed the Indian rates in case of Direct Duty paying districts. The composition duty fees, however, are still fixed at a rate relatively much lower than the excise duty, but in spite of this manufacture in Composition Duty districts is declining.

(*b*) SOURCES OF SALT.

Burma gets its supply from the following sources :—

(1) Salt manufactured from sea brine in eight districts on the coast in Lower Burma known as Direct Duty salt.

(2) Composition Duty salt produced in ten districts of Upper Burma in which efflorescent deposits or brine wells occur.

(3) Foreign salt imported direct from foreign countries, or

(*a*) re-imported from Indian ports ;

(*b*) salt manufactured in India and imported from Indian ports.

All salt consumed in Burma is of the fine white crushed variety.

(*c*) SYSTEM OF MANUFACTURE.

(*i*) *Direct Duty Salt.*

This is manufactured in Akyab, Kyaukpyu, Sandoway, Hanthawady. Bassein, Thaton, Amherst and Mergui districts.

Salt is obtained on the sea coast by boiling sea brine which has been previously concentrated by solar evaporation. Sea brine works are situated on the banks of tidal channels and creeks along the coast. They are located in swamps or low lying localities not above the level of high tide. For these works an abundant supply of brine and an impervious soil are essential. A factory requires at least four or five acres of land, but the better factories make use of 15 to 30 acres. The factory has a boiling shed and a godown ; the boiling shed is lofty and airy 30′ to 50′ long and 30′ to 40′ broad. The storage sheds or godowns usually contain a draining space and four compartments and are about 50 feet long and 40 feet wide in Amherst district and a little smaller in other districts. The furnace which is rectangular in shape is constructed in the boiling shed and is made of locally made mud bricks and is 3 to 4 feet high. When iron cauldrons are used, their sides and ends rest on the top of the furnace walls ; when earthen pots are used to boil brine, they are built with mud into an arch over the furnace. In all the Direct Duty districts iron pans of capacity ranging from 40 to 180 gallons are used.

Sea-water is trapped in channels and creeks every spring tide. It is elevated to a reservoir and then run by gravitation through a series of condensers, where its density is increased, by solar evaporation, to approximately 25°B., *i.e.*, the saturation point at which calcium sulphate

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or gypsum ceases to be deposited and the deposition of common salt commences. The dense brine is then run into a storage tank. From a sump in this tank a pipe leads the brine into a well inside the factory. The brine is thus drawn off from the bottom of the tank and, provided it is not violently agitated, rain water falling on the surface of the brine remains on top in a distinct layer owing to its lower specific gravity. The brine is lifted from the well by a bucket permanently attached to a counterpoised lever (picotah) and poured into troughs from which it is run into large iron pans set over a furnace where it is boiled until sodium chloride is deposited. The salt is then scraped and thrown through a wooden grating into a drying chamber where it is drained and then weighed into store. Firewood is obtained from neighbouring forests.

Factories usually commence laying out their evaporating beds in November as by that time most of the rain water has disappeared. For this work the average number of labourers employed in a factory is six. These labourers remain employed until the fields are completed at the end of December when the number is reduced to three or four. They are then employed in boiling the concentrated brine and in keeping the fields in repair. The production of salt commences in January and continues until the stock of concentrated brine in the brine tank is exhausted or until it is so reduced in density by rain water that it is unprofitable to boil it down. The rains begin in May and cease in October and most of the better factories manage to continue boiling until August or September. Licensees are trying to improve concentration processes so as to enable production to continue throughout the year. Payment to labour is made in a somewhat unconventional manner. The licensee feeds his men and allows them to take supplies of cigarettes, matches, curry stuff, etc., from local shops up to a small amount and at the end of the season gives them a small sum of money. The total average remuneration in kind and cash amount to about Rs. 14 a month for a labourer, and Rs. 18 to Rs. 24 a month for a headman.

The number of factories worked under this system was 214 in 1930-31, 186 in 1931-32, 185 in 1932-33, 155 in 1933-34, and 117 in 1934-35. The number of boiling pans employed is about 500. During 1934-35 out of 117 factories licensed 57 were in Amherst District and approximately produced three quarters of the total output of the province. The total output from the Direct Duty districts varies from about 7 to 9 lakhs of maunds per annum.

(ii) *Composition Duty Salt.*

This salt is manufactured in Upper Burma districts. A restriction is imposed on the size of brine boiling vessels licensed and a composition fee based on the maximum possible output of each vessel is fixed and hence the salt thus produced is called Composition Duty salt.

An area of saline earth is selected and thoroughly ploughed. Weak brine is then lifted from an adjacent well. The wells are of all sorts, some round and some square. The brine is drawn by means of picotahs or by using a rough pulley wheel with a rope and double buckets. The brine is allowed to run in narrow channels over the ploughed land and artificial efflorescence is obtained. The soil is ploughed and broken and elaborate processes are followed in preparing it and admitting the brine into it.

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Two months may be occupied in obtaining the first crop of salt efflorescence and one month for each succeeding crop. These operations are carried on under the heat of the sun. The efflorescence is scraped up and lixiviated in bamboo baskets shaped like inverted cones in earthen filters. The interior of the earthen filters which are mounds of earth 2 to 3 feet high and 3 to 6 feet in diameter is bowl-shaped and lined with clay. Effloresced earth is filled into the filter and weak well-brine is poured over it to strengthen it until 15°B is reached. This brine comes out into an earthen pot from the filter and is then boiled down for salt in the manufacturers' houses or sheds. Meantime the process of drawing brine through the salt impregnated earth is repeated at the filter. Small mud furnaces with one or two bowl-shaped cast iron cauldrons of 7 gallon capacity are used. The process of boiling is continued to complete evaporation. Boiling goes on from February to June—*i.e.,* in dry season.

The manufacturer pays a composition fee based on the capacity of the cauldron used and is otherwise free from all control. The average cauldron contains seven gallons of brine and the composition duties vary from Rs. 6 to Rs. 40 per cauldron. The output of salt varies from 10 to 100 maunds per vessel per annum, the incidence of duty being from three to fourteen annas per maund.

In some areas where the rainfall is comparatively heavy, the above process is varied by three cauldrons being used. Weak brine is placed without any preliminary concentration into the first cauldron and passed on as it increases in density to the second and finally to the third where it is boiled until its salt content is deposited. About forty to fifty thousand maunds of salt approximately 6 per cent. of Burma's total output, are annually produced under this system. The number of Composition Duty licenses in 1930-31, 1931-32, 1932-33, 1933-34 and 1934-35 was 629, 641, 741, 759 and 761, respectively. The number of vessels employed is about 900 with a total capacity of about 4,800 gallons.

The Composition Duty districts are Magwe, Pakokku, Myingyan, Yamethin, Shwebo, Sagaing, Katha, Meiktila, Upper Chindwin and Lower Chindwin. The bulk of the salt, however, is manufactured in the Shwebo, Sagaing and Lower Chindwin districts. Of current 761 licences, 298 are in the Shwebo district and 82 in the Sagaing district. The cost of production in Composition Duty districts is very high—about Re. 1 a maund. The industry is gradually declining. The method of manufacture is inefficient and costly and salt produced is of inferior quality. The continuance of the industry is possible since this work is subsidiary to agriculture. When, however, agriculture fails to pay, more attention is paid to this. The manufacturing area is wide-spread and remote. Prices for the inferior produce of this area are low and taken in kind. All members of a family work together and make a bare living out of this business. The industry would have died out, but for low assessment rates, the duty rates in force being on an average about 25 per cent. of the normal. About three thousand men are engaged in salt industry in Burma. The industry, however, suffers from lack of capital. The Officers of the Burma Salt Department do a lot of work in an advisory capacity in order gradually to encourage the Burman to improve his methods of manufacture and to meet competition from outside.

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(*d*) PRODUCTION.

The following table gives the output of salt in Burma from the year 1889 to 1934-35 :—

Year.	Output in lakhs of maunds.		Total.	Remarks.
	Direct Duty.	Composition area.		
1889	4·14	..	4·14	Financial year.
1890	2·00	..	2·00	Do.
1891	2·98	..	2·98	Do.
1892	3·24	..	3·24	Do.
1893	3·61	..	3·61	Do.
1894	4·78	..	4·78	Do.
1895	5·26	..	5·26	Do.
1896	4·89	..	4·89	Calendar year.
1897	6·20	..	6·20	Do.
1898	4·96	..	4·96	Do.
1899	6·33	..	6·33	Do.
1900	5·67	..	5·67	Do.
1901	5·85	..	5·85	Do.
1902	5·54	..	5·45	Do.
1903	7·06	..	7·06	Do.
1904	5·82	..	5·82	Do.
1905	6·30	..	6·30	Do.
1906	8·12	..	8·12	Do.
1907	8·17	..	8·17	Do.
1908	8·34	..	8·34	Do.
1909	6·69	0·75	7·44	Do.
1910	5·40	0·67	6·07	Do.
1911	5·72	0·68	6·40	Do.
1912	6·12	0·63	6·75	Do.
1913	7·58	0·46	8·04	Do.
1914	4·92	0·43	5·35	Do.

Year.	Output in lakhs of maunds.		Total.	Remarks.
	Direct Duty.	Composition area.		
1915	6·28	0·58	6·86	Financial year.
1916	8·56	0·62	9·18	Do.
1917	10·55	0·69	11·24	Do.
1918	13·53	0·66	14·19	Do.
1919	15·84	0·58	16·42	Do.
1919-20 ..	15·31	0·42	15·73	Do.
1920-21 ..	14·08	0·53	14·61	Do.
1921-22 ..	10·07	0·47	10·54	Do.
1922-23 ..	8·41	0·27	8·68	Do.
1923-24 ..	6·89	0·35	7·24	Do.
1924-25 ..	6·15	0·39	6·54	Do.
1925-26 ..	5·35	0·36	5·71	Do.
1926-27 ..	5·94	0·37	6·31	Do.
1927-28 ..	5·07	0·37	5·44	Do.
1928-29 ..	4·82	0·49	5·31	Do.
1929-30 ..	4·86	0·38	5·24	Do.
1930-31 ..	5·34	0·44	5·78	Do.
1931-32 ..	6·33	0·43	6·76	Do.
1932-33 ..	7·44	0·47	8·91	Do.
1933-34 ..	9·75	0·68	10·43	Do.
1934-35 ..	9·15	0·66	9·81	Do.

Separate figures are not available for the Composition Duty and Direct Duty Areas prior to 1910. Those given for Composition Duty districts subsequent to that year are estimates. It will be observed that during the period from 1917 to 1922 the figures for local production are the highest on record. This was due to the exclusion of foreign salt as a result of the War. The return of foreign competition had a bad effect on local production which gradually fell until 1931-32 when the effect of the imposition of the additional import duty at 4½ annas a maund on foreign sea-borne salt became manifest in increased output. Rangoon's exports being more bulky than her imports makes it possible for foreign salt to be brought out at little more than ballast rates. It is estimated that in some cases the freight on salt from Europe is less than that on salt imported from the principal manufacturing centres in Burma.

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(e) COST OF PRODUCTION.

(i) *Direct Duty areas.*—The cost of production varies with the locality and with the size of the factory and cannot be ascertained with any great accuracy. The following figures are, however, believed to be approximately correct :—

(1) For a factory producing 5,00,000 viss, *i.e.*, 21,875 maunds—Labour—

	Rs.
One Overseer at Rs. 35 p. m. for 10 months ..	350
Six coolies at Rs. 18 p. m. for 10 months	1,080
One engine driver at Rs. 20 p. m. for 6 months ..	120
One night watchman at Rs. 6 p. m. for 5 months ..	30
Food supply to labourers—7 men at Rs. 6 for 10 months	420
	2,000
Building and equipment—	
Annual repairs to factory	250
Cost of iron pans	200
Miscellaneous	150
	600
Fuel—960 stacks at Rs. 2-8-0 per stack of 108 cubic feet, the consumption being two stacks approximately per 1,000 viss or 43.75 maunds ..	2,400
Total ..	5,000

The cost therefore is Rs. 10 per 1,000 viss, *i.e.*, 3 annas 7.3 pies per maund.

(2) For a factory producing 2,00,000 viss, *i.e.*, 8,750 maunds :—

	Rs.
For labour and repairs as above	2,600
Fuel—400 stacks at Rs. 2-8-0 per stack	1,000
	3,600

The cost in this case is naturally relatively higher amounting to Rs. 18 per 1,000 viss or 6 annas 6.9 pies per maund. The expenditure on labour and buildings is practically constant for an outturn of from 2 lakhs to 5 lakhs viss, for the same number of men and the same storage space are necessary whether manufacture and issues are continuous or not. It is to be noted that the cost of production is for fine white salt which needs no crushing.

The cottage industry type of factory with its excessive cost of production and comparatively small output cannot hope to survive in competition with the better organised concerns. So the average small uneconomical factory is gradually being eliminated. Most of the big

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factories are situated in the Amherst district which produces at least 5 to 7 lakhs of maunds of this salt. Some of the factories here produce up to eight or even ten thousand maunds of salt annually. The production of a good quality salt is well established in Bassein and Amherst districts, though the average licensee is still in debt and manufacture suffers from lack of capital.

(*ii*) *Composition Duty areas.*—The cost of production in Composition Duty areas is very high and the continuance of the industry is only rendered possible by the fact that salt production is a subsidiary or cottage industry and that the price of Direct Duty salt and foreign salt in Composition Duty areas is enhanced by the cost of transport from Rangoon and other coastal towns. According to the most reliable figures available the production of 3,000 viss of salt costs—

	Rs.
Fuel	24
Pans	5
Labour 2 persons at Rs. 15 for four months	120
Total	149

i.e., Rs. 49-10-8 per 1,000 viss or Re. 1-2-1 per maund.

(*f*) FOREIGN SALT.

Foreign or imported salt is the biggest source of Burma's salt supply. Salt is imported from the United Kingdom, Germany, Spain, Aden, Port Said and Italian East Africa. The imports have varied from 15 to 25 lakhs of maunds of salt per annum. The following table shows the imports from 1889 in maunds :—

Year.	Imports in lakhs of maunds.	Remarks.
1889	11·90	Financial year.
1890	14·06	Do.
1891	13·59	Do.
1892	14·22	Do.
1893	14·77	Do.
1894	9·14	Do.
1895	12·44	Do.
1896	11·26	Calendar year.
1897	11·96	Do.
1898	12·38	Do.
1899	12·18	Do.
1900	11·19	Do.
1901	12·94	Do.
1902	15·00	Do.
1903	12·75	Do.
1904	13·49	Do.

Year.	Imports in lakhs of maunds.	Remarks.
1905	13·71	Calendar year.
1906	12·64	Do.
1907	14·86	Do.
1908	15·94	Do.
1909	16·37	Do.
1910	17·69	Do.
1911	19·26	Do.
1912	16·91	Do.
1913	17·07	Do.
1914	19·27	Do.
1915	17·35	Do.
1916	16·32	Do.
1917	11·47	Do.
1918	12·39	Do.
1919	11·11	Do.
1919-20	10·16	Financial year.
1920-21	12·23	Do.
1921-22	15·48	Do.
1922-23	16·79	Do.
1923-24	18·81	Do.
1924-25	21·75	Do.
1925-26	22·17	Do.
1926-27	21·65	Do.
1927-28	24·63	Do.
1928-29	23·37	Do.
1929-30	25·90	Do.
1930-31	24·51	Do.
1931-32	13·51	Do.
1932-33	22·43	Do.
1933-34	10·76	Do.
1934-35	15·63	Do.

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The countries of origin of the foreign salt and the quantities imported are shown in the table below :—

Country of origin.	1910-14.	1915-19.	Quinquennium.		
			1919-20 1923-24.	1924-25 1928-29.	1929-30 1933-34.
	Mds.	Mds.	Mds.	Mds.	Mds.
Great Britain	1,235,624	12,77,632	11,24,595	7,52,572	4,46,177
Aden	9,10,548	17,96,734	10,42,511	16,96,522	5,84,787
Port Said	9,50,289	15,04,028	22,36,872	36,15,177	22,96,329
Spain	5,48,505	21,32,169	11,04,651	12,84,978	6,52,477
Italian East Africa	..	..	4,40,276	9,98,758	18,14,856
Tunis	..	..	..	40,950	..
Germany	34,32,512	..	14,61,057	32,30,270	38,37,111
Salif (Turkish Post)	6,63,635	..	..	..	..
Other countries	41	1,224	780	2,465	595
Indian Ports	20,524	3,32,081	52,799	1,28,101	77,414

During the last six years the imports have been as follows :—

Country of origin.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
Great Britain ..	1,58,336	1,21,949	1,43,937	17,892	4,063	5,384
Aden	3,28,950	61,282	11	..	1,94,544	3,81,593
Port Said	7,43,980	5,55,806	2,35,589	5,25,355	2,35,599	3,03,470
Spain	70,920	2,28,400	97,843	1,93,127	62,187	..
Italian East Africa ..	3,24,581	2,72,009	4,76,536	6,46,452	95,278	1,54,787
Germany	9,34,994	11,89,208	3,81,351	8,53,009	4,78,549	7,11,831
Other Countries ..	60	91	141	182	121	3,687
Indian Ports ..	27,679	22,661	15,185	6,615	5,282	2,719
Total ..	25,89,500	24,51,406	13,50,593	22,42,632	10,75,623	15,63,471

German imports (Hamburg and Vaca) rose very high during 1930-31, but are now falling. Imports from the United Kingdom in 1933-34 were the lowest recorded. Although imports of salt from Italian East Africa managed to reach 6.46 lakhs of maunds in 1932-33, only 4.94 lakhs was consumed and proved so unpopular that in 1933-34 only 2.72 lakhs was consumed and imports dropped to 95 thousand. To sell this salt last year the price had to be brought down—as in the case of other salts, and while it fetched Rs. 68 in April 1933, the price in March 1934 was Rs. 52 compared with Rs. 67 for Hamburg and Rs. 80 for Vaca salt. The people of Burma will not use any solar salt, unless it has been reduced to a fine grain equal to or better than Burma made salt.

The Aden suppliers were busy with Bengal in 1931-32 and 1932-33 but have now turned their attention to Burma also. The total imports in 1933-34 were only about 50 per cent. of the normal. This was owing to a big stock being carried from the previous year. The imported salt is passed into consumption by the Customs authorities on payment of excise duty at the rate leviable under the Indian Tariff Act. The bulk of this salt is distributed from Rangoon. In March 1931, an extra duty of 4½ annas per maund was levied on foreign salt (not Aden salt) and then in September 1931, 25 per cent. surcharge on all imported salt. The extra duty was reduced to 2½ annas a maund in March 1933 and later on to 1½ annas in March 1936. Thus the duty these days is Rs. 1-10-6 per maund. This additional import duty has given an impetus to the local industry.

The prices of foreign salt fluctuate very greatly. The English and German salts sell at about Rs. 80 per hundred maunds while the Spanish, Red Sea, and Africa salts sell at about Rs. 65 to Rs. 70 per hundred maunds. This is exclusive of duty and surcharge.

(*g*) System of Sales.

Imported salt is passed into consumption by the Customs authorities on payment of duty at the rate leviable under the Indian Tariff Act as amended from time to time.

Locally manufactured salt is in Direct Duty districts released from departmental control by an officer issuing the quantities required to the licensed manufacturer on production of the receipted chalan for the amount of duty on all salt stored, but he is not required to pay on *bona fide* wastages in store.

No control is exercised over salt produced in Composition Duty factories. The quantity produced is small and is usually purchased by the middleman at the factory door.

(*h*) Selling Price.

Prices depend on the nature of the salt, the distance of the source of supply from the place of sale and the quantity available at the place and time of sale. In some of the remote districts prices have been known to rise by more than 100 per cent. because of local stocks running short during the closed season. Extremes in variation are, however, for short periods only. The average wholesale prices per maund for the three years ending 1934-35 were respectively Rs. 3-3-9, Rs. 3-4-5 and Rs. 3-2-9 for foreign salt. For Burma salt the prices were Rs. 2-8-2, Rs. 2-5-10 and Rs. 2-6-7.

The prices for foreign salt include duty at Re. 1-4-0, surcharge at Re. 0-5-0 and Additional Import Duty at Re. 0-1-6 per maund. The prices for Burma salt include duty and surcharge only.

Ex-factory prices at Panga, the chief producing and distributing centre, for the three years mentioned above were respectively Rs. 2-0-4, Rs. 1-13-10 and Rs. 1-14-0 including duty and surcharge.

(*i*) SUPERVISION AND COLLECTION OF DUTY.

Salt duty is levied in Burma under two distinct systems. In Upper Burma Districts where salt is manufactured, Composition Duty is assessed on the size of the vessels in lieu of the duty which would be payable on the salt produced. Composition fee is payable either in a lump sum or by instalments. The services of Revenue Officers or the Township Officers and village headmen are employed to collect these fees and in Upper Burma the village headman receives 10 per cent. commission on collections made. Direct taxation in such out of the way places where salt is manufactured would involve a costly establishment and is impracticable. This salt is sold in nearby villages and does not compete with Direct Duty salt. In the eight districts of Lower Burma a system of direct taxation on the amount of salt manufactured prevails. Salt is released from Excise control by an officer issuing the quantities required to the licensed manufacturer on production of the receipted challan for the amount of duty payable. The licensee is responsible for payment of duty on all salt stored, but he is not required to pay duty on *bona fide* wastage such as drainage while salt matures in store. The licensee is required to provide a secure storage godown as an adjunct to the boiling shed. The partition wall between the two contains a grating through which all salt is thrown as soon as it is received from the cauldrons. The godown consists of two main portions, the larger divided into several compartments for receiving the salt thrown in. One of the keys of the godown remains with the factory officer and the other with the licensee. So salt cannot be cleared unless both are present.

The six months credit system formerly in force was abolished in 1932. This system was never used to any great extent. The system by which credit for one month is allowed on quantities of salt up to 3,000 viss is, however, appreciated by the small licensee with little ready money. The Floating Bonded Warehouse System introduced in 1924 was not taken full advantage of until 1929-30, when Rangoon merchants came to an understanding with licensees and shippers in the Amherst District. This system allows shippers to transport their salt from the factories to a notified port in vessels the holds of which have been sealed by a Salt Revenue Officer. The vessel is treated as a bonded warehouse and on its arrival at the notified port the salt is issued from the vessel on payment of duty. Security for the duty is deposited by the shipper before the vessel is loaded. Thus Burma salt is gradually ousting foreign salt from some of the up-country markets and this work is gradually extending the trade of the Burman manufacturer. Although many ports and riverine stations are notified as places to which salt may be transported under this system, the bulk of the salt so shipped goes to Rangoon and Moulmein. Most salt merchants who are schooner owners prefer to hawk their salt from place to place.

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(*j*) DISTRIBUTION.

It would not be correct to say that any special variety of salt is preferred by any particular district. Every district in the Province including the Shan States is supplied with imported or locally manufactured salt or both according to the variety obtainable at the most favourable rates by the local merchants. This leads naturally to salt manufacturing districts consuming their own salt. The fish-curing and ngapi industries have their preferences. Where sea-fish is cured foreign salt is preferred ; but the moist Burma-made salt is chiefly used for the curing of fresh-water fish.

Rangoon is the distributing centre for foreign salt and during the fair weather season it also distributes large quantities of salt imported by schooners from the Amherst District. During the last few years a steady trade by rail has developed between Amherst District and the Upper Burma districts through which the railway runs. This trade by rail now continues throughout the year.

All salt entering the Province is imported by sea. Important salt sources exist beyond the eastern frontier in China, but traffic from these sources is impracticable and any current of trade which may exist tends to flow from Burma into the frontier districts of China. The exportation of salt from Burma to China is, however, prohibited by the Convention of 1894 between Great Britain and China.

(*k*) PREVENTIVE MEASURES.

The manufacture of salt is a cottage industry. Salt manufacture is engaged in by peasants and Chinese of the poorer classes born in the country and manufacture is consequently spread over somewhat scattered areas wherever these people own salt lands. The average salt manufacturer owns or hires a small area of about four to six acres. Preventive measures are adopted to stop evasion of payment of duty. In Direct Duty districts along the sea coast all salt manufactured is kept in a closed storage shed which cannot be opened except in presence of the factory officer. Moreover, as an additional safeguard the possession of more than 100 viss (about 4 maunds) in the vicinity of a factory has been made illegal. After the salt has been dried for some time in the closed chamber, it is weighed into a store. The daily outturn of salt so ascertained is compared with the theoretical output in consideration of the number of times the boiling pans are scraped per day and the density of the brine boiled. To provide a check against issues without payment of duty the producing areas are patrolled and all salt movements within these areas are covered by passes issued by Factory Officers. No licence is issued to an insecure factory.

In Composition Duty districts the manufacturer is free to make as much or as little salt and to dispose of it, as he chooses. An Inspector and two patrol officers (sub-inspectors) inspect the manufacturing areas and see that unlicensed cauldrons are not in use and that the output does not unreasonably exceed the estimated output on which the composition duty is based

Illicit manufacture in Burma is a matter of comparative ease for the province has a sparsely populated coast line of approximately 1,200 miles at any point of which it is possible for illicit salt to be manufactured.

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Inland brine springs and efflorescent areas also exist in almost every district in the interior. Since the Delhi Pact (1931) the villagers are allowed to manufacture salt for domestic consumption. The coastal area of the Northern Division consists mainly of a net work of tidal creeks and rivers along the banks of which salt manufacturing camps are formed. It is impossible to distinguish individuals boiling brine for *bona fide* home consumption from others producing salt for commercial purposes. Preventive measures are in the hands of the local Salt Revenue staff assisted by Excise and Police officers who are empowered under the Salt Act. About 100 cases are reported every year, the number increasing rapidly whenever an intensive campaign is taken up by the salt staff. In prevailing conditions it would appear that the establishment and maintenance of licensed factories in areas suitable for illicit production are the best safeguards against illicit manufacture.

(*l*) HISTORY OF ADMINISTRATION.

Some portions of Burma were acquired by the British Government in 1826, some in 1852 and the others about 1880. In the beginning the conditions being unsettled, the collection of salt revenue was not on a sound basis. About 1880 improvements were made in the system of collection. It was under the District Collectors subject to the control of the Commissioners of the Divisions. On the 1st June 1912 the Salt and Excise Departments were amalgamated and the administration of Salt Department passed to the control of the Excise Commissioner subject to general supervision of the Financial Commissioner. The Deputy Commissioners of districts assisted by the Excise staff and in Direct Duty districts by the special salt staff, carried on the work. This special staff consisted of a Chief Superintendent, an Assistant Superintendent, seven Inspectors and 38 Sub-Inspectors.

On the classification of "Excise" as a 'Provincial transferred subject', it was found to be impracticable to continue the Combined Excise-Salt Departments. The Government of India relieved the Government of Burma of the responsibility for the administration of salt revenue in Burma from 15th May 1928, when a new Salt Revenue Department was formed under the control of the Central Board of Revenue. The local administration of salt was vested in the Commissioner of Income-Tax who was appointed Commissioner of Salt Revenue and, subject to the general control of the Commissioner, a Collector of Salt Revenue was appointed to be the chief executive officer of the Salt Department, responsible for its administration and for the collection of revenue within the province. For administrative purposes the province is now divided into three Divisions, "Headquarters", "Northern" and "Southern", the former directly under the control of the Collector and the two latter each under a Superintendent. The district executive staff at the end of 1934-35 consisted of 7 inspectors (Rs. 200—10—250); 36 Sub-Inspectors (Rs. 60—5—150); 4 clerks (Rs. 70—4—90—5—125), 4 clerks (Rs. 40—4—80); 6 Head Peons and 57 Peons (Rs. 16—2|3—18—3|7—21).

Each salt manufacturing area is divided into Circles under the supervision of an Inspector and each circle is sub-divided into Factory Officer's Ranges consisting of a group of licensed factories. Four Patrol Officers

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(Sub-Inspectors) are provided to check illicit manufacture beyond the sphere of Factory Officers who are necessarily restricted to a limited radius of action.

Powers to search and detain anything liable to confiscation or to arrest any person who has committed any offence in contravention of certain sections of the Salt Act, have been delegated to Police Officers of and above the rank of an officer in charge of a Police-Station and to Excise officers of and above the rank of Sub-Inspector. Village headmen have also been appointed to exercise these powers and to inspect licensed factories within their jurisdiction.

CHAPTER XVI.

Salt Treaties with Indian States and Foreign Possessions.

(*a*) NORTHERN INDIA.

As shown in the Chapter on the History of Salt Revenue in India, the essence of the salt revenue administration system prevailing from 1820 to 1870 was the levy of duty on salt imported into British territory and the suppression of manufacture of salt within that territory. The great Inland Customs Line existed for this purpose. This system of taxation was unsound, cumbersome and a serious handicap to trade. The lease of the Sambhar Lake was taken in 1869-70. The object of the British Government in assuming charge of salt manufacture at the lake was not to make a direct profit on that manufacture but to develop the resources of the lake so as to throw into the market a large quantity of good salt at a moderate price and thus help the consumer. The lease having proved successful, it was decided to abolish the Customs Line.

With this object treaties were negotiated with Indian States in Rajputana and Central India. The treaties provided for the lease to the British Government of the more productive sources, for the closure on payment of compensation of unimportant sources and the restriction of output at works left open under the management of the Darbars, the suppression of scattered earth salt manufacture ; the abolition of transit duties and the removal of restrictions on the trade in salt which had paid duty to the British Government. The position in regard to the manufacture of salt, saltpetre and *khari* in Indian States varies with the terms of individual treaties. Though in some treaties salt alone is mentioned, in a number of cases the Ruler undertakes to prohibit absolutely the manufacture of salt whether overtly or under the guise of manufacturing saltpetre or *khari* or both. Some States in their treaties secured such a right and four—Jaisalmer, Udaipur, Gwalior and Datia—have the right on certain conditions to manufacture salt itself. States like Jaipur and Jodhpur within whose jurisdiction the salt sources at Sambhar and Pachbadra are situated were also expected to give all possible help to Government officers.

Jaipur and Jodhpur.—The lease of Sambhar including Nawa and Gudha was taken from these States on an annual rent of rupees seven lakhs *plus* a royalty of 40 per cent. of the price of all salt sold annually in excess of 17,25,000 maunds. The royalty these days amounts to about rupees five lakhs per annum varying, of course, with the total clearances. The average payment during the five years ending with 1934-35 was Rs. 4,80,599-13-10. The lease of Pachbadra and Phalodi was taken from Jodhpur for an annual payment of Rs. 1,70,000 and that of Didwana for Rs. 2,00,000. The States also receive certain quantities of salt. They are shown in the general statement at the end of this chapter.

Bharatpur.—The salt works were closed by the Maharajah in 1876-77. He was unwilling to lease the works to the British Government as Bharatpur salt could not, he represented, compete any longer with salt from Sambhar, the price of which had been so much diminished by the reduction in the cost of production and transport and by the abolition of transit duties since the opening of the Rajputana-Malwa Railway. It is said that the works then had an output of 40,000 tons per annum. No compensation was paid to the Maharaja, but Rs. 2,26,000 were paid to the manufacturers. By the terms of the agreement, salt upon which duty has been levied by the British Government is the only salt which may be consumed in the State. The Maharajah receives Rs. 1,50,000 annually and 1,000 maunds of salt free of duty.

Manufacture of salt went on in most of the States and similar agreements were entered into with all of them. Compensations under treaties were for political reasons fixed on a liberal scale and they included compensation for matters other than loss of salt making profits such as the right to establish British courts in a foreign State, the right to impose a duty on salt and compensation for abandonment of various taxes. These amount to Rs. 27,89,610-5-4 *plus* royalties due to Jaipur and Jodhpur varying with the out-turn from Sambhar Lake averaging about Rs. 5 lakhs per annum. This is for Rajputana and Central India States. Moreover, under treaty obligations the Northern India Salt Revenue Department gives 2,30,000 maunds of salt free of duty, and 34,710 maunds of salt free of duty and price to these States. The statement at the end of this chapter gives the names of various States and the amounts of cash and salt given to each.

Bahawalpur.—An agreement was entered into with the Nawab of Bahawalpur. He is paid Rs. 80,000 annually for observing the terms of the treaty and as compensation for suppression of salt manufacture within his territory.

Nepal.—Salt is exported to Nepal under necessary safeguards. The British Indian Sources are also responsible for the supply of salt of Nepal. About 4 lakhs of maunds are exported each year, 3 lakhs foreign salt sent through Bihar and United Provinces, and about one lakh from Sambhar.

(*b*) BOMBAY PRESIDENCY.

With a view to avoiding preventive lines and the attendent hardships to the public, arrangements have been made with the maritime States except those in the Kathiawar Peninsula and with inland States in which there are such facilities to stop manufacture in their territories. Such arrangements have not only effected large savings in preventive establishment, but have given substantial protection to the revenue of the contracting States. Owing to he susceptibilities of different Chiefs, it has not been possible to have uniform agreements with all the States. Some receive cash payments, some are supplied with free salt, others get compensation in cash and kind for prohibiting manufacture in their territories.

Kathiawar.—About 37 States in Kathiawar have agreed to stop exports to British territories, to produce only inferior or 'Ghasia' stuff as opposed to Baragra salt and to restrict manufacture to the amount required for consumption in Kathiawar. Manufacture of salt has been going on in Kathiawar for centuries. This right has been conceded by the British Government on certain conditions which stipulate (1) no new sources to be opened or old ones extended without the consent of the British Government, (2) consumption to be limited to States of Kathiawar, (3) States

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to prevent export to British territory, (4) Government officers to be permitted to inspect the sources, (5) export by sea allowed from one port to another in the State. Only one State, Dharangdhra, has the right to manufacture Baragra salt. They have a factory at Kuda. The State is permitted to export salt by sea to places outside India. Within the last few years Government sanctioned the export of sea salt produced in the maritime States of Kathiawar such as Navanagar, Bhavnagar, Morvi, Porbandar to Bengal and foreign countries.

Cutch.—An agreement was entered into with the Rao of Cutch in 1885. He limits manufacture to his requirements and stops exports to British India, but is allowed to export by sea to foreign ports outside India. Outside Kathiawar no other State has a right to manufacture salt. They surrendered their rights under agreements.

Baroda.—In the Gujarat Province, consisting of Baroda, Kadi and Navsari divisions, the manufacture and collection of salt from places in which salt is spontaneously produced are prohibited and possession or traffic in the same is illegal. The State is permitted to export salt direct from Okhamandal and Kodinar in Kathiawar to Calcutta in vessels which do not halt at any intermediate port. Export from Baroda to foreign countries is permitted without any limit of tonnage. The Okha salt works are situated in the Okhamandal Sub-Division of the Okha State. The State has given the manufacturing firm concessions granting them an exclusive right of manufacturing salt in Okhamandal for 30 years, the State receiving royalties and taxes amounting to Re. 0-10-0 a ton.

Travancore and Cochin.—Salt is allowed to be exported from the sea salt works in Bombay to Cochin and Travancore States on the recovery of a special reduced rate of three pies per maund only under convention of 1865 between Government and the two States. The intention was to secure to each of the contracting parties the salt revenue within its own territory by the adoption of similar rates of duty and selling price. As a complement to this arrangement, the States were to be supplied with salt from British sources on the same terms as those on which it was sent to the other British Indian ports. At that time salt was sent to Malabar and South Kanara free of duty bearing only a charge of three pies per maund on account of local expenses. Imports into Malabar and Kanara ceased from 1877-78, but duty-free salt is still supplied to Travancore and Cochin at the special reduced rate of three pies per maund.

Other States.—In 1881 an agreement was entered into with the Nawab of Cambay. He is paid Rs. 40,000 and given 500 maunds of salt. Agreements were also entered into with Janjira and Savantvadi States. In 1880 manufacture in Southern Mahratta country and the Deccan was prohibited and the Chiefs and jagirdars compensated. Similarly the chiefs of Patri and Jhinjuvada States and the Nawab of Palanpur are given compensation in cash and kind in consideration of their rights to manufacture salt in the Runn having been sold to the British Government. Salt is issued free of duty in limited quantities for domestic consumption to the States of Cambay and Radhanpur and the estates of Patri and Jhinjuvada and also occasionally in replacement of duty-paid salt proved to have been lost at sea before passing a preventive station. Under the agreement, the Janjira State annually receives duty-free salt at the rate of 12 lbs. per head of population.

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Just as States in and outside Kathiawar surrendered their right, similarly none of the Indian States within the area in which sea salt is consumed has the right to manufacture salt. The cash compensations granted to the different States for the suppression of the right of manufacture of salt or its collection from natural sources or from salt earth are shown in the statement at the end of this chapter.

(c) MADRAS.

Up to May 1865 the manufacture of salt in the States of Travancore and Cochin was a Government monopoly, the selling price in Travancore being Re. 1-1-0 a maund, and in Cochin 12 annas. By the convention of that year, both States agreed to adopt the British Indian rates of duty and to raise the selling price at the inland depots " so as to place the salt of Cochin and Travancore and British India on the same footing in the market ". Since then the selling price at Cochin and Travancore has followed the successive changes in the rates of duty in British territory. Duty-free salt is also supplied to the Darbars from Madras at the nominal duty of Re. 0-0-3 per maund under terms of the treaty. Madras supplies to the States from Tuticorin factories.

The rules for the duty-free supply of Madras salt to the two Darbars, as revised in 1920, are as follows :—

(1) The salt shall be carried in sealed bags and weighed on arrival.

(2) No allowance shall be made for wastage in transit.

(3) Single duty at the rate in force in British India shall be levied on all short deliveries.

(4) The duty so levied shall be credited to the Darbar concerned.

Mysore.—Earth salt manufacture is a recognised local industry in Mysore State and is permitted under licences issued by Revenue Officers. To prevent such salt finding its way into British territory export beyond the limits of the State is forbidden and the manufacture of salt in the State on border of the British Territory prohibited within five miles. The State obtains its supply from Bombay and Madras.

Pudukottai.—The manufacture of earth salt in Pudukottai State was a monopoly for several years and the salt was quietly sent to the British Territory. This being dangerous to revenue, a treaty was entered into between the Madras Government and the State in 1887 according to which the State agreed to prohibit salt manufacture within its territory for an annual compensation of Rs. 38,000.

Nizam's Dominions.—Salt is made locally to a limited extent in Hyderabad, but the State has given an undertaking that it would not be exported into British Territory. Supplies of salt are obtained from Bombay and Madras.

French Possessions.—Certain quantities of salt are annually supplied to the French Settlements in the Madras Presidency at cost price under an old convention with the French Government. The convention of 1818, renewed in 1837, stipulates that the British Government shall deliver such quantity of salt as shall be requisite for the domestic use and consumption of the inhabitants of the French Settlements in India ; the purchase, delivery and subsequent sale of the said quantity being regulated according to the stipulations contained in the Convention of 7th March 1815. Under that convention the French Government sell the salt at the price at which salt is sold by the British Government in the vicinity of the French Settlements.

(*d*) SIND.

An agreement was entered into with the Mir of Khairpur in 1883-84 under which he is entitled to receive at cost price as much Maurypur salt as he requires, free of duty. The arrangement was made on the assumption that the quantity required would be 12,000 maunds. The quantity of salt supplied duty-free has recently been 23,000 maunds.

(*e*) BENGAL.

Salt is purchased by the Frontier tribes all along the eastern and north eastern frontiers, but there are no special arrangements. The salt so purchased is all duty-paid.

French Possessions.—In 1815 a convention was made with the French Government under the terms of which the East India Company agreed to supply sufficient salt for consumption in the French Settlement of Chandernagar from the Orissa and Midnapore agencies. The quantities of salt supplied free of duty varied from 4,000 to 12,000 maunds per annum. This arrangement held good till 1839 when the Company entered into an agreement to pay a sum of Rs. 20,000 per annum to the French Government; since then salt which has paid duty to the British Government is consumed in the Settlement.

(*f*) BURMA.

Burma has some States such as the Shan States and Kachin Hill Tracts. In the past brine deposits in the Shan States were worked on a petty scale. Practically all the salt consumed throughout Burma and the Shan States is duty-paid. About two lakhs of maunds are exported each year to the Shan States.

(*g*) GENERAL STATEMENT.

The following statement gives the names of states or territories together with compensation in cash and kind paid to each :—

State or Territory.	Compensation.			
	Cash.			Kind.
	Rs.	A.	P.	
Bengal—				
French Possessions	20,000	0	0	
Bombay—				
Akalkot	142	0	10	
Aundh	1,045	1	7	
Cambay	40,000	0	0	500 maunds of duty-free salt.
Daphlapur	114	11	2	
Jath	1,148	0	0	

State or Territitory	Compensation.			
	Cash.			Kind.
	Rs.	A.	P.	
Janjira	13,000	0	0	
Jamkhandi	1,490	12	9	
Jhinjuvada	7,788	0	0	340½ maunds of duty-free salt.
Kurunadvad (Senior)	1,193	9	0	
Konher Rao Wadikar ..	8	12	0	
Miraj (Senior)	62	1	2	
Miraj (Junior)	6	12	0	
Patri	11,300	0	0	340½ maunds of duty-free salt.
Phaltan	2,010	9	9	
Radhanpur	11,048	0	0	
Savanvadi	5,500	0	0	
Savanur	32	0	0	
Sangli	233	10	6	
Central India Agency—				
Bhopal	10,000	0	0	
Datia	10,000	0	0	
Dewas (Senior and Junior) ..	825	0	0	
Gwalior	3,12,500	0	0	
Indore	61,875	0	0	
Jaora	2,500	0	0	
Narsingh Garh	618	12	0	
Raj Garh	618	12	0	
Rutlam	1,000	0	0	
Sailana	412	8	0	
Sampthar	1,450	0	0	
Sitamau	2,000	0	0	
Rs.	4,03,800	0	0	
Madras—				
Pudukottai	20,000	0	0	
North-West Prontier Province—				
Kohat Chieftains and villagers ..	50,000	0	0	
Punjab—				
Bahawalpur State	80,000	0	0	
Rajputana Agency—				
Ajmer Istamrardars	4,178	0	0	
Alwar	1,09,550	0	0	1,000 maunds free of duty and price
Bikanir	6,000	0	0	76,000 mds. at half duty.
Bharatpur	1,50,500	0	0	1,000 maunds free of duty and price.
Bundi	8,000	0	0	
Dholpur	25,788	0	0	300 maunds free duty and price.
Jaipur	6,88,309	2	7	7,000 maunds free of duty and price.
Jhalawar	2,500	0	0	

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State or Territory.	Compensation.			
	Cash.			Kind.
	Rs.	A.	P.	
Rajputana Agency—contd.				
Jodhpur	9,61,395	5	3	2,25,000 maunds free of duty and 24,000 maunds free of duty and price.
Kaibania	105	0	0	
Karauli	5,694	15	0	50 maunds free of duty and price.
Kishen Garh..	33,000	0	0	50 maunds free of duty and price.
Kotah	19,175	0	0	300 maunds free of duty and price.
Lawa	700	0	0	10 maunds free of duty and price.
Rampur	..			5,000 maunds free of duty.
Mir Abdul Wahid and others ..	251	5	6	
Shahpura	5,000	0	0	
Sarohi	10,800	0	0	
Tonk	20,000	0	0	
Udaipur	2,04,150	0	0	1,000 maunds free of duty and price.
Total Rajputana agency ..	22,55,096	12	4	

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CHAPTER XVII.

Consumption and Prices of Salt in India.

A.—BRITISH INDIA.

(*a*) PUNJAB AND DELHI.

The normal consumption of the Punjab and Delhi is about 33 lakhs of maunds of which 27-28 lakhs come from the Salt Range Mines at Khewra, Warcha and Kalabagh. Sambhar and Didwana send about 5-6 lakhs to the southern-most districts of the Punjab and Delhi. Salt from Mandi State Mines is consumed in the adjacent places. The Khewra, Warcha and Kalabagh Mines supply about 17, 6 and 3½ lakhs of maunds respectively and Sambhar and Didwana about 4 and 1 lakh. The consumption per head is about 10 lbs. per annum.

The following table shows the consumption of salt in the Punjab and the sources of supply :—

Year.	Issues.			From			
	Khewra.	Warcha.	Kala-bagh.	Sambhar.	Didwana.	Mandi.	Total.
1901-02	19·44	..	..	2·37	2·49	1·39	25·69
1902-03	19·87	..	..	2·44	2·26	1·29	25·86
1903-04	21·07	..	..	2·44	2·01	1·26	26·78
1904-05	21·32	..	..	2·44	1·85	1·13	26·74
1905-06	20·81	..	..	3·11	2·05	·98	26·95
1906-07	19·86	..	..	2·77	1·96	·94	25·53
1907-08	21·18	..	..	3·23	1·97	1·14	27·52
1908-09	23·22	..	..	2·75	1·05	1·13	28·15
1909-10	23·12	..	..	2·35	1·77	1·01	28·25
1910-11	23·97	..	..	2·28	2·10	·96	29·31
1911-12	24·68	..	..	2·38	2·32	1·10	30·48
1912-13	24·01	..	..	1·21	2·62	·93	28·77
1913-14	24·65	..	..	1·26	2·37	·94	29·22
1914-15	26·14	..	..	2·52	3·00	·77	32·43
1915-16	21·76	..	..	1·97	2·85	1·03	27·61
1916-17	24·28	..	..	3·13	3·37	1·31	32·09
1917-18	18·47	5·60	..	1·78	1·21	1·34	28·40
1918-19	18·86	4·44	..	2·62	1·52	1·32	28·76

Year.	Issues.			From			
	Khewra.	Warcha.	Kala-bagh.	Sambhar.	Didwana.	Mandi.	Total.
1919-20	19·26	5·71	..	2·63	3·89	1·30	32·79
1920-21	15·98	2·81	1·84	1·53	1·15	1·46	24·77
1921-22	16·64	5·10	3·71	2·68	2·01	1·27	31·41
1922-23	21·96	4·82	2·84	2·29	3·99	1·21	37·11
1923-24	9·20	4·19	·63	1·76	·76	1·34	17·28
1924-25	24·97	11·52	1·44	3·57	3·63	1·31	46·44
1925-26	12·55	7·01	1·35	2·43	1·15	1·23	25·72
1926-27	16·86	6·23	3·35	2·55	2·06	1·17	32·22
1927-28	15·21	6·01	2·54	5·18	2·05	1·05	32·04
1928-29	16·62	6·37	3·76	3·03	1·65	·99	32·42
1929-30	17·13	5·13	3·46	4·47	1·16	·87	32·22
1930-31	15·90	5·91	3·21	2·70	1·10	1·14	29·96
1931-32	15·85	5·93	3·63	4·22	1·14	1·02	31·79
1932-33	15·60	6·25	3·20	2·95	1·16	1·19	30·35
1933-34	15·64	6·54	2·95	2·07	1·56	0·94	29·70
1934-35	15·89	7·14	3·44	1·80	0·94	1·23	30·44

Between 1901-02 and 1916-17 the figures represent issues from the Salt Range as a whole.

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Market Prices.—The following table shows the average prices of salt in the principal marts of the Punjab for the years 1931-32 to 1934-35 :—

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.				Description of salt.	Wholesale prices per British Maund as ascertained by officers of the Department.			
	1931-32.	1932-33.	1933-34.	1934-35.		1931-32.	1932-33.	1933-34.	1934-35.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
PUNJAB.									
Lahore	2 8 2	2 10 2	2 8 0	2 8 0	Salt Range	2 6 4	2 8 0	2 8 0	2 7 6
Rawalpindi	2 5 11	2 9 3	2 12 2	2 9 0	Do.	2 2 8	2 7 0	2 6 0	2 7 8
Shahpur	2 7 6	2 8 1	2 10 2	2 8 0	Do.	2 4 6	2 3 10	2 4 10	2 0 0
Multan	2 9 3	2 10 4	2 11 7	2 11 0	Do.	2 6 1	2 8 8	2 8 4	2 11 8
Amritsar	2 9 3	2 10 6	2 11 7	2 10 0	Do.	2 7 0	2 10 0	2 10 0	2 10 0
Jullundur	2 11 0	2 13 6	2 13 9	2 14 0	Do.	2 5 4	2 8 0	2 8 5	2 8 0
Ludhiana	2 10 6	2 13 8	2 13 9	2 14 0	Do.	2 9 10	2 10 6	2 10 9	2 10 0
Ferozepore	2 9 3	2 12 2	2 11 2	2 11 0	Do.	2 7 1	2 9 9	2 9 4	2 9 0
Ambala	2 9 0	2 10 4	2 9 5	2 11 0	Do.	2 6 3	2 8 10	2 10 3	2 8 6
DELHI PROVINCE.									
Delhi	2 6 11	2 9 1	2 9 3	2 9 6	Do.	2 12 0	2 10 6	2 9 6	2 10 6
					Sambhar	2 6 0	2 7 3	2 7 3	2 6 6

The average provincial retail prices during 1931-32, 1932-33, 1933-34 and 1934-35 were Rs. 2-8-10, Rs. 2-10-11, Rs. 2-11-3 and Rs. 2-10-8 respectively in the Punjab. In Delhi they were Rs. 2-6-11, Rs. 2-9-1, Rs. 2-9-3 and Rs. 2-9-0 respectively.

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(*b*) UNITED PROVINCES.

In the chapter on saltpetre it has been said that there are a large number of crude saltpetre works and refineries in the United Provinces wherein salt is educed as by-product. The normal consumption of the United Provinces is about 60 lakhs of maunds. The supply comes mainly from Sambhar, Kharaghoda and Khewra which supply about 40-42, 9-10, 3-4 lakhs respectively. Some salt about 2-3 lakhs also comes from Pachbadra and about 4-5 lakhs of foreign salt are consumed. Some saltpetre salt is also consumed. The Northern India Salt Sources supply about 45-46 lakhs of maunds. The balance is supplied by Kharaghoda and foreign countries. Foreign salt comes from Calcutta westwards and Sambhar salt goes eastwards till they meet at a point near Gorakhpur where the rates of both are almost equal. Imported salt is consumed in the eastern districts of the United Provinces, Gorakhpur and Balia. Fyzabad, Basti, Bahraich are the chief marts for Kharaghoda salt, while Cawnpore is the chief distributing centre for Rajputana salt. The average consumption appears to be about 11 lbs. per head per annum.

The following table shows the consumption and chief sources of supply :—

Year.	Sambhar.	Pachbadra.	Kharaghoda.	Khewra.	Bengal (foreign).	Total.
1901-02	21·83	7·91	8·56	3·44	3·73	45·47
1902-03	25-10	3·44	8·81	3·22	3·99	44·56
1903-04	27·01	1·60	9·64	3·01	3·83	45·09
1904-05	28·87	·43	9·93	2·69	3·61	45·53
1905-06	32·32	·36	10·74	3·06	4·13	50·61
1906-07	32·10	·27	10·08	3·21	5·00	50·66
1907-08	35·68	·18	10·62	3·55	5·90	55·93
1908-09	32·55	·05	10·00	4·42	5·36	52·38
1909-10	33·34	·10	8·95	6·02	5·07	53·48
1901-11	28·45	·70	10·34	5·53	5·02	50·04
1911-12	33·10	1·34	9·41	5·93	5·31	55·09
1912-13	32·88	1·55	9·72	6·90	4·91	55·96
1913-14	31·89	1·87	10·68	6·02	4·90	55·36
1914-15	36·10	2·80	11·18	6·75	4·54	61·37
1915-16	30·50	2·42	9·83	7·87	1·37	51·99
1916-17	42·27	2·57	15·26	7·98	·12	68·20
1917-18	28·66	·60	11·61	5·85	·31	47·03

Year.	Sambhar.	Pach-badra.	Khara-ghoda.	Khewra.	Bangal (foreign).	Total.
1918-19	45·40	·92	13·15	6·50	·17	66·14
1919-20	41·11	1·81	11·43	4·33	·29	58·97
1920-21	31·37	·94	10·83	3·08	2·44	48·66
1921-22	45·80	·80	10·70	4·42	2·28	64·00
1922-23	50·62	·53	5·12	3·45	5·00	64·72
1923-24	32·80	·13	4·28	1·23	5·00	43·44
1924-25	56·73	·30	10·19	3·44	5·00	75·66
1925-26	39·68	*Nil*	6·80	1·92	5·00	53·40
1926-27	52·45	·05	7·37	2·05	..	61·92
1927-28	61·00	·74	7·08	2·09	..	70·91
1928-29	50·76	2·37	7·61	1·86	..	62·60
1929-30	35·92	6·77	12·49	1·69	..	56·87
1930-31	23·68	8·36	7·35	1·87	..	41·26
1931-32	39·46	3·77	9·52	2·05	..	54·80
1932-33	42·49	1·93	8·27	1·58	..	54·27
1933-34	47·55	1·72	9·36	1·65	..	60·28
1934-35	46·50	2·20	7·92	1·43	..	58·05

The statement makes no claim to accuracy. It has been compiled from the figures available in the various Administration reports, but the statistics are not quite correct. Since 1921-22 no figures are available to show the quantity of foreign salt imported. The figure inserted (5 lakhs) is an estimate.

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Market Price.—The following table shows the average wholesale and retail prices of different salts in the principal markets of the United Provinces :—

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.				Description of salt.	Wholesale prices per British maund as ascertained by officers of the Department.			
	1931-32.	1932-33.	1933-34.	1934-35.		1931-32.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
UNITED PROVINCES.									
Meerut	2 9 1	2 15 0	2 15 2	2 11 0	Salt Range	2 12 2	3 2 0	3 2 0	3 12 0
					Sambhar	2 7 0	2 10 0	2 9 3	2 9 0
Agra	2 6 4	2 8 4	2 8 10	2 8 0	Salt Range	3 8 0	3 12 0	3 12 0	3 7 0
					Sambhar	2 4 0	2 8 0	2 8 0	2 6 0
Jhansi	2 12 2	2 14 7	2 15 2	2 15 0	Salt Range	4 3 6	4 1 11	3 8 6	3 12 0
					Sambhar	2 14 3	2 15 7	2 12 10	2 13 0
Cawnpore	2 9 0	2 12 4	2 10 6	2 11 0	Salt Range	..	..	..	..
					Pachhadra	2 5 7	2 7 4	2 6 2	2 7 1
					Sambhar	2 6 9	2 10 9	2 8 5	2 10 8
					Kharagodha	2 3 6	2 3 6	2 4 5	2 5 5
					Didwana	2 4 6	2 5 0	2 2 11	2 4 4
Allahabad	3 15 3	4 0 5	3 14 5	3 1 0	Salt Range	4 1 3	4 4 0	4 5 6	4 7 0
					Sambhar	2 13 1	2 15 6	3 1 6	3 1 5

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.				Description of salt.	Wholesale prices per British maund as ascertained by officers of the Department.			
	1931-32.	1932-33.	1933-34.	1934-35.		1931-32.	1932-33	1933-34.	1934-35.
UNITED PROVINCES.—*contd.*									
Mirzapur	3 1 6	3 6 2	3 3 2	3 2 0	Salt Range	5 0 0	4 7 0	5 0 0	5 0 0
					Sambhar	2 15 6	2 11 6	3 0 0	3 4 0
Saharanpur	2 9 10	2 11 2	2 11 7	2 11 0	Salt Range	3 4 0	3 5 4	3 2 0	3 2 0
					Sambhar	2 10 0	2 10 8	2 10 8	2 11 0
Gorakhpur	3 5 1	3 10 6	3 5 1	3 5 0	Salt Range	3 8 1	3 12 0	3 9 0	3 5 11
					Sambhar	3 14 11	3 4 0	3 0 0	3 10 6
					Liverpool	..	..	..	..
					Aden	..	..	..	..
					Golandaz	3 10 7	..	..	3 2 9
					Kharagodha	..	3 6 0	3 5 0	..
Sitapur	3 14 0	4 11 3	3 12 3	3 1 0	Salt Range	3 12 0	4 0 0	4 8 0	3 8 0
					Sambhor	2 13 0	3 0 0	2 12 0	2 11 0
Bareilly	2 10 6	2 13 1	2 12 9	2 12 0	Salt Range	4 0 0	4 0 0	3 14 7	3 14 10
					Sambhar	2 11 4	2 10 10	2 12 7	2 12 10
Lucknow	2 10 10	2 12 6	2 12 9	2 12 0	Salt Range	3 8 8	4 0 0	3 12 8	4 5 0
					Sambhar	3 5 0	2 12 9	2 11 6	2 15 0

Fyzabad	2 13 11	3 1 0	2 15 10	2 15 0	Salt Range	3 10 0	3 8 7	4 3 5	3 12 4
					Sambhar	2 11 7	2 15 4	2 13 5	2 13 0
					Kharagodha	3 0 1	..	..	3 3 0
					Golandaz	..	..	3 3 0	..
Sultanpur	3 2 5	3 4 9	3 7 8	3 4 0	Salt Range	2 13 9	3 6 0	3 11 0	3 14 0
					Sambhar	2 13 0	3 3 0	3 2 7	3 4 0
					Kharagodha	3 0 0	..	..	..
					Golandaz	..	..	3 9 0	3 13 9
Muzaffarnagar	2 10 3	2 10 6	2 11 7	2 9 0	Salt Range	3 0 0	2 10 7	3 2 2	3 3 3
					Sambhar	2 12 0	3 3 5	2 8 6	2 8 0
Garhwal	4 11 4	4 9 8	4 10 2	4 13 0	Salt Range	..	3 12 0	6 2 0	5 5 0
					Sambhar	4 11 0	3 4 0	5 1 0	4 9 0

The average provincial retail prices during 1931-32, 1932-33, 1933-34 and 1934-35 were Rs. 3-0-11, Rs. 3-4-1. Rs. 3-2-7, and Rs. 3-0-0 per maund respectively.

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(*c*) CENTRAL PROVINCES.

The total consumption of the Central Provinces is about 25-26 lakhs of maunds the bulk of which, about 16 lakhs, is supplied by the Bombay sea factories. Kharaghoda is the other important source supplying about 7-8 lakhs. Madras supplies about 2 lakhs per annum and small quantities also come from Pachbadra and Sambhar. At Nagpur, Yeotmal, Khamgaon and Akola, the Bombay sea factories hold the field. At Khandwa, Bombay sea and Kharaghoda compete and at Raipur, Bombay sea and Madras. At Saugor, Sambhar salt is supreme, while at Jubbulpore, Kharaghoda competes successfully with it. The consumption per head is about 16 lbs. per annum.

The following table shows the consumption of salt in the Central Provinces together with the sources of supply :—

Year.	Kharaghoda.	Bombay etc.	Madras.	Sambhar	Pachbadra.	Total.
1901-02	15·35		2·33	·10	1·06	18·84
1902-03	15·78		2·36	·16	·68	18·98
1903-04	15·69		4·12	·15	·90	20·86
1904-05	16·58		4·03	·17	·90	21·68
1905-06	19·31		1·47	·21	1·03	22·02
1906-07	20·80		2·08	·72	1·16	24·76
1907-08	6·19	15·37	·76	·89	1·30	24·41
1908-09	6·19	16·19	·85	1·25	1·07	25·55
1909-10	6·44	15·59	·58	1·23	1·27	25·11
1910-11	6·69	15·15	·54	1·54	1·26	25·18
1911-12	6·69	16·28	·56	·86	1·36	25·55
1912-13	6·31	14·95	·75	1·01	1·74	24·76
1913-14	6·56	14·93	·96	1·05	2·19	25·69
1914-15	5·94	15·58	·56	·91	2·11	25·10
1915-16	6·72	18·02	·40	1·76	1·87	27·77
1916-17	6·29	16·34	·99	2·52	2·14	28·28
1917-18	5·94	21·98	·68	1·10	·06	29·76
1918-19	7·84	17·92	·96	·96	1·01	28·69
1919-20	6·71	15·91	1·62	·73	1·02	25·99
1920-21	5·84	7·78	1·73	1·28	·83	17·46
1921-22	6·85	6·57	1·35	1·17	1·06	17·00

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Year.	Kharaghoda.	Bombay etc.	Madras.	Sambhar	Pachbadra.	Total.
1922-23	7·50	16·95	2·43	1·41	1·10	29·3
1923-24	2·55	12·79	·96	·96	·88	18·14
1924-25	8·27	16·34	1·99	1·99	2·01	30·60
1925-26	5·09	14·16	1·34	1·55	..	22·14
1926-27	5·80	16·78	0·86	1·26	·19	24·89
1927-28	5·73	17·42	1·31	1·95	·17	26·58
1928-29	5·67	17·54	1·35	1·76	·25	26·57
1929-30	6·68	19·54	1·37	1·27	·65	29·51
1930-31	6·06	13·94	1·20	0·71	1·01	22·92
1931-32	6·46	16·75	1·56	1·11	·85	26·73
1932-33	5·93	14·57	2·96	1·24	·19	24·89
1933-34	6·84	13·60	3·62	1·18	·25	25·49
1934-35	5·73	12·54	3·26	1·22	·24	22·99

Market Prices.—The following statement shows the annual average prices of salt in the principal marts in the Central Provinces :—

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.			
	1931-32.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
CENTRAL PROVINCES.				
Jubbulpore	3 6 0	3 5 4	3 6 6	3 5 3
Saugor	2 0 11	3 2 7	3 1 7	3 1 0
Nagpur	3 10 2	3 14 1	3 14 9	3 7 8
Nimar	3 5 5	3 6 0	3 2 10	2 13 9
Hoshangabad	3 1 3	3 1 3	3 1 10	3 2 2
Raipur	3 7 3	3 14 9	3 11 0	3 7 8

The average provincial retail prices during 1931-32, 1932-33, 1933-34 and 1934-35 were Rs. 3-5-2, Rs. 3-7-4, Rs. 3-6-5 and Rs. 3-3-7 respectively.

(*d*) NORTH-WEST FRONTIER PROVINCE.

Supplies of salt in the North-West Frontier Province are obtained from the quarries in the Kohat District at Jatta, Bahadurkhel and Karak, and in smaller quantities from Khewra, Warcha and Kalabagh mines. The Kohat mines supply about 5½ lakhs, Khewra 2½, Warcha 1|2 and Kalabagh about 1|3 lakh per annum. It is impossible to state the consumption of the North-West Frontier Province with any accuracy. The normal issues to the province are about six and a half lakhs of maunds, but about half of this is exported to Afghanistan and to the Frontier tribes. The figures given in the old Administration Reports showing the consumption per head varied from 4 to 18 lbs. per annum and are not quite reliable. Taking the consumption to be about 3 lakhs, the average consumption per head per annum is 11 lbs.

The following table shows the issues to the province from the sources of supply : —

Year.	Issue from	
	Kohat.	Salt Range.
1901-02	3·36	..
1902-03	3·16	·07
1903-04	3·72	·08
1904-05	3·95	·08
1905-06	3·20	·47
1906-07	3·52	·41
1907-08	4·21	·60
1908-09	4·18	·58
1909-10	4·20	·52
1910-11	4·39	·48
1911-12	5·16	·58
1912-13	5·27	·38
1913-14	4·93	·93
1914-15	5·68	2·32
1915-16	4·98	1·90
1916-17	7·03	1·37
1917-18	5·36	1·74
1918-19	6·03	1·73
1919-20	5·84	1·33
1920-21	6·43	1·89
1921-22	3·69	·97
1922-23	5·25	2·74
1923-24	4·57	·86
1924-25	6·38	2·53
1925-26	4·88	1·51

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Year.	Issue from	
	Kohat.	Salt Range.
1926-27	5·32	2·21
1927-28	5·08	2·91
1928-29	5·67	3·11
1929-30	5·90	2·54
1930-31	5·87	2·76
1931-32	5·65	3·25
1932-33	5·33	3·94
1933-34	5·61	3·42
1934-35	5·33	3·36

Market Prices.—The following table shows the annual average prices of salt in the principal marts in the North-West Frontier Province :—

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.				Description of Salt.	Wholesale prices per British maund as ascertained by officers of the Department.			
	1931-32.	1932-33.	1933-34.	1934-35		1931-32.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rs. a. p.	R s. p.	Rs. a. p.	Rs. a. 0.
Peshawar	2 4 5	2 4 8	2 4 3	2 3 5	Salt Range	..	2 4 1	2 3 7	2 3 1
					Kohat	2 2 11	..	..	..
Dera Ismail Khan ..	2 5 2	2 8 7	2 8 2	2 7 4	Salt Range	2 1 11	2 6 6	2 5 6	2 6 0
					Kohat	..	..	..	..

(e) RAJPUTANA AND CENTRAL INDIA.

The normal consumption is about 24 lakhs of maunds. Sambhar and Kharaghoda are the main sources of supply supplemented in appreciable quantities by Pachbadra and Didwana and in small quantities by Bombay sea factories. Consumption per head is about 11 lbs. Sambhar supplies about 14 lakhs, Kharaghoda 5 lakhs and the other sources about 5 lakhs.

The following table shows the consumption of salt with the sources of supply :—

Year.	Rajputana.			Rajputana and Central India.		Central India.		Total.
	Sambhar.	Didwana.	Pachbadra.	Kharaghoda.	Sea.	Sambhar.	Pachbhadra.	
1907-08 ..	7·65	·94	2·61	5·11	·13	4·92	2·04	23·40
1908-09 ..	6·88	1·09	2·53	4·85	·23	4·74	1·88	22·20
1909-10 ..	8·11	1·10	2·86	5·50	·13	5·39	2·12	25·21
1910-11 ..	7·17	1·31	2·97	4·92	·16	7·23	1·85	25·61
1911-12 ..	7·59	1·08	2·36	5·84	·28	4·27	2·59	24·01
1912-13 ..	7·77	1·18	2·76	5·89	·22	5·75	2·95	26·52
1913-14 ..	8·09	1·02	2·55	6·21	·23	5·66	3·50	27·26
1914-15 ..	8·15	1·58	3·04	4·44	·24	5·85	2·10	25·40
1915-16 ..	7·35	1·10	2·71	5·58	·27	4·67	2·03	23·71
1916-17 ..	9·35	·96	2·84	4·71	·20	5·28	2·15	25·49
1917-18 ..	6·98	1·04	1·75	4·31	·48	4·35	2·25	21·16
1918-19 ..	9·76	·33	4·31	5·49	·29	4·57	1·53	26·28
1919-20 ..	7·29	·78	2·86	5·98	·09	3·96	1·71	22·67
1920-21 ..	6·93	·86	2·30	4·45	·15	3·45	·77	18·91
1921-22 ..	7·66	1·11	3·32	4·50	·15	4·36	1·60	22·70
1922-23 ..	7·50	1·27	3·22	5·99	·11	4·70	2·68	25·47
1923-24 ..	4·27	·54	2·99	2·42	..	2·39	·93	13·54
1924-25 ..	9·81	1·01	3·19	4·98	..	6·56	1·93	27·48
1925-26 ..	8·20	1·22	2·18	4·52	..	5·14	·02	21·18
1926-27 ..	7·46	1·07	2·56	4·56	..	6·67	·10	22·42
1927-28 ..	9·12	1·07	2·80	3·68	..	5·90	·25	22·82
1928-29 ..	7·72	1·02	3·84	4·81	..	5·93	·16	23·48
1929-30 ..	6·79	·89	4·21	4·51	..	4·35	1·08	21·83
1930-31 ..	6·35	1·07	3·00	4·43	..	3·59	1·10	19·54
1931-32 ..	7·16	1·13	2·47	4·95	..	5·13	·74	21·58
1932-33 ..	8·36	1·08	3·18	4·43	..	6·93	·27	24·25
1933-34 ..	8·63	1·24	3·53	5·79	..	4·42	·22	23·83
1934-35 ..	8·60	1·31	3·53	3·57	..	4·36	·48	21·85

Market Prices.—The following table shows the annual average prices of salt in the principal marts in Rajputana and Central India :—

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.				Description of Salt.	Wholesale prices per British maund as ascertained by officers of the Department.			
	1931-32.	1932-33.	1933-34.	1934-35.		1931-32.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
RAJPUTANA.									
Mewar	2 11 3	2 15 8	2 13 0	2 14 3	....	..	..	..	..
Ajmere	2 7 3	2 7 3	2 7 10	2 8 0	Salt Range	4 13 4	4 15 8	4 12 3	4 13 0
					Sambhar	2 5 11	2 5 10	2 6 8	2 6 8
					Pachbadra	2 4 10	2 6 10	2 5 0	2 5 6
					Didwana	..	..	..	2 5 6
Jodhpur	2 4 3	2 8 0	2 8 0	2 8 0	....	..	..	..	..
Jaipur	2 1 3	2 3 5	2 6 8	2 5 9	....	..	..	..	..
Bharatpur	2 8 0	2 9 4	2 9 5	2 8 0	....	..	..	..	..
CENTRAL INDIA.									
Indore	2 10 8	2 13 9	3 2 0	2 13 9	....	..	..	..	..
Neemuch	2 9 1	2 11 5	2 10 6	2 10 3	....	..	..	..	..
Gwalior	2 10 8	2 10 8	2 13 9	2 10 0	....	..	..	..	..

The average retail prices during 1931-32, 1932-33, 1933-34 and 1934-35 in Rajputana were Rs. 2-6-5, Rs. 2-8-9, Rs. 2-8-7 and Rs. 2-8-9 respectively and those in Central India were Rs. 2-10-2, Rs. 2-11-11, Rs. 2-14-1, Rs. 2-11-4 respectively.

(*f*) SIND.

Sind consumes about 5 lakhs of maunds of salt every year. The bulk of its supply comes from the Maurypur Salt Works near Karachi. Some salt is also got from Darwari and Saran deposits. A little about 25—30 thousand maunds is imported from the Punjab and Pachbadra. The Punjab salt is consumed in the Sukkar, Larkana and Upper Sind districts. The salt produced in Darwari and Saran is consumed in the neighbouring districts. The consumption per head of the population which is arrived at by dividing the issues by the population was 9.69 lbs. in 1933-34 and 9.72 lbs. in 1934-35.

The following table shows the consumption of salt in Sind :—

In lacs of maunds.

Year.	Maurypur.	Saran.	Darwari.	Imports from Punjab.	Total.
1907-08	3·29	·27	·29	·11	3·96
1908-09	3·19	·22	·29	·18	3·88
1909-10	3·40	·25	·24	·11	4·00
1910-11	3·44	·24	·23	·24	4·15
1911-12	3·68	·30	·31	·32	4·61
1912-13	3·69	·30	·30	·29	4·58
1913-14	3·69	·23	·26	·25	4·43
1914-15	3·77	·05	·38	·34	4·54
1915-16	3·73	·31	·44	·68	5·16
1916-17	3·89	·28	·28	·36	4·81
1917-18	6·06	·58	1·88	·25	8·77
1918-19	5·03	·35	3·16	·47	9·01
1919-20	3·62	·28	·70	·72	5·32
1920-21	3·60	·30	·39	·39	4·68
1921-22	3·53	·25	·23	·20	4·21
1922-23	3·64	·24	·18	·33	4·39
1923-24	3·61	·17	·20	·16	4·14
1924-25	4·43	·24	·17	·56	5·40
1925-26	4·02	·25	·17	·18	4·62
1926-27	4·03	·27	·13	·04	4·27
1927-28	4·39	·24	·18	·07	4·88
1928-29	4·43	·25	·14	·31	5·13
1929-30	4·62	·24	·15	·32	5·33
1930-31	4·17	·18	·15	·41	4·91
1931-32	4·18	·11	·31	·35	4·95
1932-33	3·30	·06	·24	·28	3·88
1933-34	3·69	·10	·45	·38	4·62
1934-35	3·56	·14	·55	·38	4·63

Market Prices.—The issue prices at the Salt Works in Sind, including duty are at present Rs. 1-14-0 for Maurypur salt delivered at Karachi, Rs. 1-11-6 at Darwari, Rs. 1-14-0 for Darwari salt delivered at Dhoro Naro, the nearest railway station and Rs. 1-12-3 at Saran. The wholesale selling price of Maurypur salt is Rs. 1-15-0 per maund at Karachi, Rs. 2-7-0 at Hyderabad, and Rs. 2-4-0 at Sukkur, the retail prices at these stations being Rs. 2-2-0, Rs. 2-8-0 and Rs. 2-8-0 respectively. Darwari and Saran salt sell in Thar Parkar at Rs. 2-10-0 wholesale and Rs. 3-2-0 retail. Rock salt is also on sale in Upper Sind, the wholsale price at Sukkur being Rs. 2-14-0 and retail price Rs. 3-2-0. At Jacobabad, in Upper Sind, Maurypur salt sells wholesale at Rs. 2-9-0 and Punjab salt at Rs. 3-8-0.

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(*g*) BENGAL.

The chapter on foreign salt shows that Bengal and the adjoining portion of Bihar, Orissa and Assam mostly consume imported salt. The average annual imports in Bengal are about 500,000 tons or over 140 lakhs of maunds. The imports during 1933-34 and 1934-35 were 1,23,28,620 and 1,40,05,861 maunds respectively. These do not represent the salt consumed within the province since some salt is conveyed by the East Indian Railway into the United Provinces, some goes to Bihar and some is transported into Nepal, Sikkim and Bhutan. Bengal proper consumes about 80 lakhs maunds only.

Until 1921-22 the Government of Bengal reported what was thought to be the consumption in Bengal itself. The Department of Statistics until that year also supplied figures showing the export of salt by railway from Bengal. These figures, for what they are worth, are reproduced in the statement below :—

Year.	Imports by Sea.		Imports by Rail.		Reported Consumption in Bengal.	Exports by rail.
	Bombay.	Madras.	Madras.	N. I. S. R.		
1911-12	8·31	..	·33	..	95·58	42·47
1912-13	9·34	·32	·27	·04	76·43	58·54
1913-14	9·38	..	·34	·04	72·27	64·10
1914-15	8·76	2·61	·14	·59	78·04	60·95
1915-16	4·25	3·17	·04	·59	78·56	47·83
1916-17	3·61	3·80	1·13	·59	70·77	41·73
1917-18	·29	1·35	6·08	2·08	69·69	27·51
1918-19	·44	·10	1·96	·80	76·52	29·82
1919-20	4·23	..	·68	·15	78·13	38·43
1920-21	4·50	·15	·26	·03	84·46	44·31
1921-22	4·90	4·81	·49	·08	88·14	48·92
1922-23	7·64	5·58	·70	·26	151·14	..
1923-24	2·54	·06	·13	·06	113·54	..
1924-25	9·74	·10	·38	·18	141·74	..
1925-26	3·36	..	·16	·18	135·07	..
1926-27	6·02	..	·15	·23	133·16	..
1927-28	8·78	..	·20	·23	134·20	..
1928-29	4·92	..	·20	·32	141·56	..
1929-30	7·69	0·86	0·18	·32	154·66	..
1930-31	6·17	..	0·59	..	148·77	..
1931-32	9·63	4·59	0·11	..	140·05	..
1932-33	3·58	4·22	0·75	..	126·97	..
1933-34	3·82	3·48	0·04	..	136·00	..
1934-35	5·09	4·12	..	..	124·32	..

From 1932-33 onwards figures showing exports by railway are not available. The total issues have therefore, been given for these years in column 6. This statement indicates that Bengal proper requires about 78—80 lakhs of maunds of salt per annum.

Market Prices.—Prices vary greatly. Before the War Rs. 50 per 100 maunds was a fair price for Liverpool salt and Rs. 40 for Port Said or Aden salt. During War days prices rose to as much as Rs. 500 as there was acute shortage of salt. Now-a-days Rs. 60 per 100 maunds is a fair

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average for Liverpool or German salt. Aden, Massowah, Port Said, etc., are about Rs. 10 lower. The prices fluctuate very much and sometimes even go down to Rs. 35 to Rs. 40 per 100 maunds.

The following statement shows the average wholesale price per maund of salt in the bazars at the headquarters of the districts of Bengal :—

Divisions or Districts.	Average for twelve months.		
	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
Burdwan—			
Burdwan	2 8 0	2 2 10	2 10 0
Birbhum	2 11 0	2 11 0	2 11 0
Bankura	2 9 9	2 9 6	2 9 6
Midnapur	2 10 0	2 8 0	2 10 0
Hooghly	2 11 0	2 8 0	2 12 0
Howrah	2 6 6	2 4 0	2 8 0
Average	2 9 5	2 7 3	2 10 1
Presidency—			
24-Parganas	2 8 0	2 4 0	2 4 0
Calcutta	2 5 6	2 4 0	2 3 0
Nadia	2 13 3	3 0 0	2 9 0
Murshidabad	2 8 0	2 10 0	2 8 0
Jessore	2 12 0	2 12 0	2 10 0
Khulna	2 8 0	2 6 0	2 10 0
Average	2 9 1	2 8 8	2 7 4
Dacca—			
Dacca	2 10 0	2 8 0	2 12 0
Mymensingh	2 10 10	2 8 0	2 8 0
Faridpur	2 10 0	2 8 0	2 9 0
Bakerganj	2 9 6	2 7 6	2 6 0
Average	2 10 1	2 7 10	2 8 9

Divisions and Districts.	Average for twelve months.		
	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
Chittagong—			
Chittagong	2 6 6	2 4 6	2 5 0
Noakhali	2 9 0	2 10 0	2 10 0
Tippera	2 10 3	2 12 0	2 11 0
Average	2 8 7	2 8 10	2 8 8
Rajshahi—			
Rajshahi	2 3 0	2 8 0	2 10 0
Dinajpur	2 12 6	2 10 6	2 11 6
Jalapaiguri	2 12 0	2 12 0	2 12 0
Rangpur	2 13 3	3 2 0	2 12 0
Bogra	2 13 0	2 9 1	2 10 8
Pabna	2 11 0	2 12 0	2 12 0
Malda	2 8 0	2 8 6	2 12 0
Darjeeling	3 14 0	3 10 0	3 12 0
Average	2 10 10	2 13 0	2 13 6
Average of all the Districts	2 10 10	2 9 6	2 10 2

(*h*) Bihar and Orissa.

The consumption of the old Province of Bihar and Bengal was about 24 lakhs in 1901-02 and 35 lakhs in 1909-10. It was practically all foreign salt imported *via* Calcutta. Now-a-days the normal annual consumption of Bihar and Orissa is about 55 lakhs of maunds. Orissa obtains her requirements from the adjacent Madras factories, while Bihar consumes mostly foreign salt, about 40 lakhs. About 9 to 10 lakhs maunds come from Madras, and about 4 or 5 lakhs from Khewra. Sambhar also supplies about a lakh of maunds. The imports from Khewra and Sambhar rose to 11 to 12 lakhs of maunds during the War days when foreign salt could not be had in sufficient quantities. In addition small quantities of saltpetre salt also are consumed.

The following table shows the issues to the Province of Bihar and Orissa since 1910-11 :—

Year.	Foreign.	Sambhar.	Khewra.	Madras.	Total.
1910-11	37·24	1·61		9·99	48·84
1911-12	38·81	1·76		9·95	50·52
1912-13	44·44	1·78		10·85	57·07
1913-14	48·44	1·60		10·62	60·66
1914-15	46·45	·73	2·84	10·23	60·25
1915-16	35·98	3·63	6·44	9·93	55·98
1916-17	30·58	10·81	8·96	12·00	52·35
1917-18	17·05	10·32	5·16	13·00	45·53
1918-19	19·16	11·33	14·34	10·63	55·46
1919-20	27·84	5·17	12·09	11·25	56·35
1920-21	30·73	2·53	10·76	10·48	54·50
1921-22	36·03	1·35	5·67	11·66	54·71
1922-23	40·00	1·84	9·05	10·47	61·36
1923-24	30·00	·79	1·08	7·65	39·52
1924-25	50·00	1·04	6·99	9·78	67·81
1925-26	40·00	·47	4·84	7·92	53·23
1926-27	40·00	1·04	5·91	9·67	56·62
1927-28	40·00	1·94	6·46	11·51	59·91
1928-29	40·00	1·92	7·31	11·98	61·21
1929-30	40·00	·88	7·11	13·96	61·95
1930-31	40·00	0·25	5·75	11·16	57·16
1931-32	40·00	0·92	6·50	12·47	59·89
1932-33	40·00	3·55	7·19	10·68	61·42
1933-34	40·00	2·95	6·72	10·52	60·19
1934-35	40·00	2·36	7·35	7·87	57·58

Figures showing the imports of foreign salt into Bihar are not available from 1922-23 onwards. Those given are estimate only (40 lakhs).

Market Prices.—The following statement shows the annual average prices of salt in the principal marts in Bihar and Orissa from 1931-32 to 1934-35 :—

Mart and Province.	Retail prices per British maund recorded by the Statistical Bureau.				Description of Salt.	Wholesale prices per British maund as ascertained by officers of the Department.			
	1931-32.	1932-33.	1933-34.	1934-35.		1931-32.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
BIHAR.									
Patna	3 2 5	3 4 0	3 6 2	3 10 0	Salt Range	3 0 0	3 3 7	3 4 0	3 4 0
					Sambhar	..	..	..	..
					Liverpool	2 9 9	3 1 11	2 10 0	2 12 0
Saran (Chapra)	3 1 0	3 5 4	3 0 9	2 15 0	Salt Range	..	3 3 0	3 4 3	3 2 0
					Sambhar	2 15 0	2 15 0	2 10 8	4 0 0
					Liverpool	3 0 0	3 1 0	2 12 6	3 13 6
Muzaffarpur	3 7 8	3 10 2	3 10 2	3 10 0	Salt Range	3 6 6	3 10 0	3 10 0	3 10 0
					Sambhar	3 1 0	..	..	3 5 3
					Liverpool	..	..	..	..
Champaran (Motihari) ..	3 2 8	3 5 11	3 2 8	3 0 0	Salt Range	3 7 6	3 12 3	3 14 2	4 0 0
					Sambhar	..	..	..	..
					Liverpool	3 0 0	3 5 0	3 2 4	3 0 0
Monghyr	3 5 4	3 11 6	3 15 7	3 10 0	Slat Range	3 12 0	3 10 0	3 12 0	3 12 0
					Sambhar	..	..	..	..
					Liverpool	5 12 0	2 0 0	3 0 0	3 0 0
Gaya	3 1 0	3 4 9	3 4 9	3 0 0	Salt Range	3 2 0	3 4 0	3 8 0	3 4 0
					Sambhar	..	..	..	..
					Liverpool	..	3 0 0	3 0 0	2 12 0

The average provincial retail prices during 1931-32, 1932-33, 1933-34 and 1934-35 were Rs. 3-3-4, Rs. 3-6-11, Rs. 3-6-0, Rs. 3-4-10 respectively. In Orissa the prices are lower than in Bihar owing to the former's proximity to the Ganjam factories.

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(*i*) MADRAS.

The Madras Salt factories on an average produce about 100 to 120 lakhs of maunds per annum and supply most of the demand of the Presidency. This is consumed throughout the East coast districts and in the inland districts of Madura and Trichinopoly. In other districts, Bombay salt comes in along with Madras salt. In Kurnool, Coimbatore and Nilgiri the consumption of Bombay salt amounts to about one-third of the total demand. Most of the demand of Bellary, Malabar, Anantpur and South Kanara districts is met by Bombay. The total supply from Bombay sources is about 14 lakhs of maunds or about 14-15 per cent. of the total consumption of the Madras Presidency. Foreign salt is imported to a very small extent only. The annual consumption is 110—115 lakhs and the consumption of salt per head of population varies from 13.7 lbs. per annum in the North Arcot and Chittoor Districts and 15.3 lbs. in the Ceded Districts to 25.6 lbs. in Nellore—average being 17-18 lbs. During 1933-34 and 1934-35 it was 17.84 and 17.86 lbs. respectively.

The following table shows the consumption of salt in the Madras Presidency :—

[In lakhs of maunds.]

Year.	Issues from factories for local consumption.	Imports by sea and rail chiefly from Bombay.	Total. consumption.
1908-09	85·76	14·33	102·27
1909-10	86·75	16·76	104·36
1910-11	86·83	17·00	105·26
1911-12	87·54	17·62	107·25
1912-13	89·16	17·40	108·41
1913-14	88·33	16·32	106·05
1914-15	92·93	17·89	112·09
1915-16	80·58	21·65	102·24
1916-17	91·17	18·76	109·93
1917-18	84·66	15·77	100·43
1918-19	94·26	16·80	111·06
1919-20	94·47	17·02	111·49
1920-21	90·82	17·71	108·53

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[In lakhs of maunds.]

Year.	Issues from factories for local consumption.	Imports by sea and rail chiefly from Bombay.	Total. consumption.
1921-22	89·12	17·45	106·57
1922-23	99·17	19·56	118·73
1923-24	90·74	16·96	107·70
1924-25	100·74	22·00	122·74
1925-26	94·68	18·86	113·54
1926-27	94·71	17·75	112·46
1927-28	98·28	15·39	113·67
1928-29	97·64	15·50	113·14
1929-30	95·59	17·02	112·61
1930-31	92·87	15·79	108·66
1931-32	96·35	17·89	114·24
1932-33	86·92	15·60	101·92
1933-34	95·22	13·01	108·32

Market Prices.—The following table gives the average retail prices of salt per maund at the headquarter stations of each district during 1932-33, 1933-34 and 1934-35 :—

Districts.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
1. Ganjam	2 15 1	2 10 11	2 12 10
2. Vizagapatam	2 14 1	2 11 10	2 11 6
3. Godavari, East	2 6 4	2 1 6	2 1 3
4. Godavari, West	2 5 10	2 8 6	2 8 6
5. Kistna	2 9 0	2 5 3	2 8 8

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Districts.	1932-33.	1933-34.	1934-35.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
6. Guntur	2 6 4	2 7 0	2 7 6
7. Kurnool	3 7 8	3 7 2	3 5 11
8. Bellary	3 13 6	3 4 6	3 2 1
9. Anantapur	3 1 7	3 3 2	2 14 9
10. Cuddapah	2 11 6	2 9 3	2 10 9
11. Nellore	2 1 0	2 0 10	1 15 6
12. Chingleput	2 4 2	2 2 5	2 1 11
13. Madras	2 9 3	2 3 9	2 2 5
14. South Arcot	2 11 6	2 10 1	2 9 0
15. Chittoor	2 11 10	2 8 6	2 7 8
16. North Arcot	2 9 3	2 8 0	2 6 9
17. Salem	2 6 7	2 12 5	2 12 10
18. Coimbatore	2 6 9	2 7 9	2 7 6
19. Tricihnopoly	2 9 10	2 9 10	2 13 1
20. Tanjore	2 4 4	2 4 9	2 3 6
21. Madura	2 4 9	2 4 4	2 6 9
22. Ramnad	2 4 9	2 2 7	2 2 9
23. The Nilgiris	3 1 7	3 0 6	3 1 5
24. Tinnevelly	2 2 5	2 3 9	2 2 11
25. Malabar	2 10 5	2 10 8	2 6 11
26. South Kanara	2 15 1	3 12 5	2 13 3

(*j*) BOMBAY PRESIDENCY.

Consumption.—The total yearly consumption of salt in the Bombay Presidency amounts to about 39 lakhs of maunds of which about 29 lakhs is supplied by sea factories and about 8 lakhs by the Kharaghoda salt works and about three lakhs is imported from Goa. Kharaghoda salt has a well-defined area of consumption. It does not go further south than Surat. Attempts to introduce it into the Deccan met with no success. In the tract between the Narbudda and the Mahi,

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Baragra salt and sea salt are consumed side by side. North of the Mahi, Baragra salt is the only salt in licit consumption in British territory or in Indian States except in Kathiawar where some of the States have the privilege of manufacturing salt. Salt from Goa is imported for consumption in the British districts of the Southern Mahratta country. A Customs line exists along the Goa Frontier. Small quantities of table salt are also imported. The consumption per head is about 13-14 lbs. per annum. During 1933-34 and 1934-35 the average was 13.01 and 11.73 lbs. respectively.

The following table shows the consumption of salt in the Bombay Presidency since 1908-09 :—

Year.	Issues from Kharaghoda.	Sea Factories.	Imports from Goa.	Total consumption.
1908-09	5·27	22·89	3·55	31·77
1909-10	5·60	22·53	4·02	32·15
1910-11	5·71	25·08	3·59	34·38
1911-12	5·83	26·91	3·55	36·29
1912-13	5·94	25·80	3·35	35·09
1913-14	6·05	27·26	3·41	36·72
1914-15	6·66	27·93	3·39	37·98
1915-16	6·68	27·21	5·53	39·42
1916-17	6·26	23·35	3·92	33·53
1917-18	6·21	22·16	3·48	31·85
1918-19	7·19	32·75	2·25	42·19
1919-20	6·56	28·19	3·58	38·33
1920-21	6·81	30·34	2·56	39·71
1921-22	6·12	30·99	2·64	39·75
1922-23	7·39	28·03	2·96	38·38
1923-24	5·94	28·13	2·82	36.89
1924-25	7·53	32·17	3·36	43·06
1925-26	7·17	28·83	3·25	39·25
1926-27	7·35	27·63	3·52	38·50
1927-28	7·82	29·26	3·07	40·15

Year.	Issues from Kharaghoda.	Sea Factories.	Imports from Goa.	Total consumption.
1928-29	8·09	30·12	3·31	41·52
1929-30	7·40	29·35	2·07	38·82
1930-31	7·67	29·19	2·03	38·89
1931-32	7·80	28·12	1·85	37·77
1932-33	7·43	30·03	1·43	38·89
1933-34	8·56	30·64	·95	40·15
1934-35	7·38	27·72	1·46	36·56

Market Prices.—The following statement shows the average market price of salt in the several Districts in the Bombay Presidency during the years 1931-32, 1932-33, 1933-34 and 1934-35 :—

	1931-32.		1932-33.	1933-34	1934-35.
Districts.	1-4-31 to 29-9-31. Rs. a. p. 1 4 0	30-9-31 to 31-3-32. Rs. a. p. 1 9 0	Duty. Rs. a. p. 1 9 0	Duty. Rs. a. p. 1 9 0	Duty. Rs. a. p. 1 9 0
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Bombay	2 2 8	2 4 11	2 5 6	2 13 1	2 12 0
Ahmedabad	2 4 7	2 7 10	2 8 0	2 8 2	2 8 4
Kaira	2 4 1	2 9 11	2 8 0	2 8 0	2 8 0
Panch Mahals	2 8 0	2 8 0	2 8 0	2 8 0	2 8 0
Broach	2 4 8	2 8 0	2 8 0	2 8 4	2 8 0
Surat	2 2 7	2 7 1	2 7 6	2 7 6	2 8 7
Thana	2 3 2	2 10 0	2 10 8	3 2 7	3 1 11
Kolaba	2 8 9	3 2 0	2 12 1	3 1 7	3 5 8
Ratnagiri	2 4 6	2 10 0	2 6 10	2 13 0	2 6 8
Kanara	3 5 3	3 14 11	3 9 0	3 10 6	3 4 5

Districts.	1931-32.		1932-33.	1933-34.	1934-35.
	1-4-31 to 29-9-31 Rs. a. p. 1 4 0	30-9-31 to 31-3-32. Rs. a. p. 1 9 0	Duty. Rs. a. p 1 9 0	Duty. Rs. a. p. 1 9 0	Duty. Rs. a. p. 1 9 0
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Nasik	2 3 10	2 7 3	3 3 0	3 2 11	2 12 5
Khandesh West	2 11 4	3 8 8	3 10 0	3 13 3	3 1 10
Khandesh East	3 2 3	3 7 4	4 0 4	3 8 8	3 8 6
Ahmednagar	2 9 1	3 1 4	3 10 6	3 6 5	2 14 6
Sholapur	2 12 1	3 11 5	4 4 6	3 13 9	3 3 10
Poona	2 5 7	2 14 10	3 5 1	3 2 2	2 12 8
Satara	2 14 3	2 15 3	3 7 1	3 6 7	2 12 3
Belgaum	2 4 1	2 7 5	3 5 1	4 6 1	3 0 3
Dharwar	3 2 2	3 6 8	3 6 1	4 6 6	3 8 10
Bijapur	2 12 1	3 0 2	2 14 9	3 10 8	2 14 9

(*k*) BURMA.

The whole of Burma including the Shan States consumes imported or locally manufactured salt. It is not possible to separate the areas in which different kinds of salt are consumed. Imported salt is distributed from Rangoon. As shown in the chapter on foreign salt, Burma imports about 80,000 tons or 22-23 lakhs maunds of salt annually, though imports during 1933-34 fell to $10\frac{3}{4}$ lakhs only. During 1934-35 the imports were 15.63 lakhs. Export of salt to China is prohibited by the Convention of 1894 between Great Britain and China. The total consumption is about 25-26 lakhs of maunds out of which 5-6 lakhs is locally manufactured salt, and the rest foreign salt. Local salt is consumed in areas adjacent to the source of production.

Before the War Burma depended for salt supply on Germany, but now the cheaper Port Said and Italian East Africa and Aden solar salts are replacing the dearer English, German and Spanish salts. The consumption per head is about 17 lbs. Prices in Burma vary enormously with the nature of salt used and distance of the centre of consumption from the source of supply. The provincial average retail price is about Rs. 4 a maund ranging from Rs. 2-12-0 to Rs. 5-8-0 in different districts.

B.—INDIAN STATES AND FOREIGN POSSESSIONS.

(*a*) Northern India.

The chapter on salt treaties shows that many States get compensation in kind. Some States are also allowed to manufacture salt for their own consumption. Figures of consumption in Rajputana and Central India have already been given.

Kashmir.—The average consumption of salt in Kashmir comes to about 3½ lakhs maunds which is obtained from the Punjab mines. About 1.79 lakhs per annum is issued direct to Kashmir, the balance appears in the ordinary issues to the Punjab.

Bahawalpur.—Salt consumed is got from the Punjab salt mines.

Nepal.—Salt is exported to Nepal free of duty under necessary safeguards. The consumption of the State is about 4 lakhs, three lakhs being foreign salt sent through Bihar and the United Provinces and the rest Sambhar salt.

(*b*) Bengal.

There are no special arrangements for the supply of salt to the Indian States in Bengal ; the salt purchased by the inhabitants of the States is all duty-paid.

Salt which has paid duty to the British Government is consumed in the French possessions (Chandernagore).

(*c*) Sind.

The Khairpur Durbar is supplied duty-free salt. The annual consumption is about 23,000 maunds.

(*d*) Burma.

Practically all salt consumed throughout Burma is duty paid. About 2 lakhs of maunds are exported each year to the Shan States.

(*e*) Bombay.

The chapter on Salt Treaties shows that some of the States are allowed to manufacture salt in their territories and export by sea. Some States are allowed to manufacture only "ghassia" or inferior quality salt. Some States get salt as compensation under terms of their treaties. Some of the States get their supply from locally manufactured salt, others get Baragra salt from Kharaghoda. Travancore, Cochin, Nizam's Dominions and Mysore States get salt from Bombay and Madras both.

(*f*) Madras.

Travancore and Cochin.—The State of Travancore derives its supplies of salt (*a*) from a few small local factories, (*b*) by importation from Bombay by sea and (*c*) since 1913 by importation from Madras. Cochin has no local sources and until 1916 derived its entire supply from Bombay.

Since that year the State has occasionally indented on the Madras factories. The imports into Travancore and Cochin are shown in the following table :—

Year.	Imports in lakhs of maunds.	
	From Bombay.	From Madras.
1907-08	8·52	..
1908-09	9·74	..
1909-10	7·76	..
1910-11	8·69	..
1911-12	7·59	..
1912-13	8·55	..
1913-14	5·97	2·52
1914-15	8·28	·47
1915-16	7·21	1·00
1916-17	4·27	1·02
1917-18	4·56	2·66
1918-19	2·22	7·52
1919-20	4·45	2·64
1920-21	7·20	4·81
1921-22	4·34	5·02
1922-23	6·12	3·14
1923-24	5·84	4·18
1924-25	5·74	3·99
1925-26	6·16	5·01
1926-27	5·44	4·14
1927-28	6·06	3·87
1928-29	5·65	2·32
1929-30	6·64	0·79
1930-31	4·69	0·26
1931-32	5·51	0·27
1932-33	2·92	0·23
1933-34	4·59	1·44
1934-35	5·76	1·64

The annual consumption is about 8-9 lakhs. The increase in the quantity taken from Madras in 1933-34 is reported to be due to failure of local manufacture in the Travancore State.

Mysore.—Mysore State obtains its main supplies from Bombay and Madras. Earth salt is also manufactured locally. The following table gives details of imports from Bombay and Madras. The total consumption is about 7-8 lakhs :—

Year.	In lakhs of maunds. Imports from Bombay.	Madras.	Total.
1908-09	5·16	·63	5·79
1909-10	5·82	1·14	6·96
1910-11	4·87	·97	5·84
1911-12	5·49	·89	6·38
1912-13	5·37	1·03	6·40
1913-14	5·18	1·13	6·31
1914-15	5·58	1·10	6·68
1915-16	5·95	·93	6·88
1916-17	5·60	1·10	6·70
1917-18	4·55	1·03	5·58
1918-19	5·08	1·42	6·50
1919-20	4·10	1·66	5·76
1920-21	4·15	·94	5·09
1921-22	4·89	1·21	6·10
1922-23	6·60	1·16	7·76
1923-24	4·72	1·02	5·74
1924-25	6·60	1·36	7·96
1925-26	6·42	1·17	7·59
1926-27	6·09	1·02	7·11
1927-28	6·60	0·93	7·53
928-29	7·20	1·01	8·21
1929-30	5·96	1·18	7·14
1930-31	5·98	0·54	6·52
1931-32	6·73	0·91	7·64
1933-34	6·28	1·72	8·00

Nizam's Dominions.—Salt is made locally to a limited extent in H. E. H. Nizam's Dominions. Supplies are chiefly obtained from Bombay and Madras. The total consumption is about 16 lakhs. The following table gives the imports from Bombay and Madras.

Year.	In lakhs of maunds. Imported from Bombay.	Madras.
1908-09	13·73	2·40
1909-10	13·27	1·84
1910-11	13·11	2·29
1911-12	14·17	1·83

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Year.	In lakhs of maunds.	
	Imported from	
	Bombay.	Madras.
1912-13	13·79	2·03
1913-14	14·56	2·00
1914-15	14·61	1·65
1915-16	15·16	·84
1916-17	12·99	1·84
1917-18	13·06	1·41
1918-19	16·54	2·81
1919-20	13·23	1·74
1920-21	11·81	1·51
1921-22	12·97	1·95
1922-23	13·55	3·84
1923-24	11·62	2·39
1924-25	14·67	2·69
1925-26	13·89	1·66
1926-27	15·02	1·37
1927-28	14·94	1·63
1928-29	14·97	1·78
1929-30	12·51	1·83
1930-31	16·04	1·62
1931-32	16·04	1·63
1932-33	14·50	1·70
1933-34	13·02	5·31
1934-35	13·49	2·07

The Bombay factories supply the western portion of Hyderabad and the Madras factories on the Coromandel Coast, the eastern. There is little real competition between the two sources and the large increase in the imports from Madras during 1933-34 was due to temporary shortage in Bombay.

Pudukottai.—The State obtains its supplies from the Madras factories in Tanjore and Tinnevelly Districts.

French Settlement.—Salt is annually supplied to the French Settlement in the Madras Presidency at cost price under an old Convention. During 1933-34 and 1934-35, 58,126 and 60,870 maunds were issued to the French Government.

C.—INDIA AS A WHOLE.

The following statement shows the normal demand of the various provinces together with their normal sources of supply. It will be seen that the normal demand for India (excluding Burma) is about 510 lakhs of maunds. Of this about 125 lakhs consist of Madras salt, 90 lakhs of Bombay sea salt, 25 Kharaghoda, 80 Rajputana salt sources, 40 Punjab

Salt mines, 20 Karachi, 6 Kohat mines and 124 lakhs imported salt. The last figure is made up of about 100 lakhs imported from Aden and other countries and 24 lakhs from Indian States (Okha, Morvi and Porbandar). Aden now-a-days heads the list of imported salts in Bengal and supplies about 70—80 lakhs or about 50—60 per cent. of the total demand. Indian sources especially Karachi and Okha too are steadily gaining ground in the Bengal market. Bengal and Assam entirely depend on imported salt. Bihar does not show such a determined preference for it. There is no danger of shortage such as occurred during the War days. Even then the trouble was due to speculation rather than to any serious lack of supplies.

In Madras a shortage of supply can only be of a local nature, since the factories are scattered all over the coast. Bombay sea factories and Kharaghoda are practically safe from climatic conditions and there is hardly any possibility of a failure of manufacture. The output at Sambhar, once a precarious source, has now been stabilized. Even if a failure were to occur owing to abnormal rainfall, the Sambhar market could be supplied by Pachbadra, Kharaghoda and Khewra. Any failure of supplies from Khewra can be made up from Warcha and Kalabagh.

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Statement showing the Normal Consumption of different

(In lakhs of

Places.	Imported.	Madras.	Bombay sea.	Kharagodha.	Sambhar.	Pachbadra.	Didwana.
Bengal and Assam ..	76·0	4·0	5·0	..	..	..	..
Bihar and Orissa ..	40·0	9·0	..	..	2·0	..	..
Central Provinces ..	..	3·0	14·0	6·0	1·2	0·5	..
United Provinces ..	5·0	..	..	8·0	45·0	2·0	..
Rajputana and Central India.	..	..	..	4·0	13·0	4·0	1·2
Punjab	..	..	..	..	2·0	..	2·0
N. W. Frontier Province and Afghanistan.	..	..	..	..	..	..	..
Kashmir and Jammu ..	..	..	..	..	..	..	..
Sind	..	..	..	..	..	..	..
Bombay	..	..	30·0	7·50	..	..	..
Travancore and Cochin ..	..	3·0	6·0	..	..	..	..
Nizam's Dominions ..	..	5·0	13·5	..	..	..	..
Mysore	..	2·0	6·0	..	..	..	..
Madras	..	95·0	15·0	..	..	..	..
Nepal	3·0	..	..	..	1·5	..	..
Other States	..	..	..	..	1·4	2·0	..
Total ..	124·0	121·0	89·50	25·50	66·1	8·5	3·2
Maximum issues ..	154·66 (1929-30)	137·59 (1924-25)	104·01 (1924-25)	33·66 (1918-19)	85·09 (1927-28)	13·51 (1930-31)	7·68 (1922-23)
Maximum production ..	162·46 (1929-30)	166·20 (1918-19)	133·70 (1918-19)	49·44 (1920-21)	111·90 (1918-19)	15·01 (1929-30)	7·49 (1922-23)
Minimum production ..	83·79 (1917-18)	81·50 (1914-15)	79·19 (1921-22)	12·64 (1926-27)	12·30 (1911-12)	*Nil.* (1927-28)	·58 (1925-26)

kinds of salt in various provinces of India.

maunds.)

Khewra.	Warcha.	Kalabagh.	Kohat.	Maurypur.	Saran and Dilyar.	Mandi.	Goa.	Saltpetre.	Total.
1	..	..	..	18·0	..	..	..	..	103·1
7·0	..	..	..	..	..	..	..	0·2	58·20
..	..	..	..	..	..	..	..	..	24·7
2·0	..	..	..	..	..	..	..	0·3	62·3
..	..	..	..	..	..	..	..	..	22·2
17·0	7·0	3·0	..	..	..	1·2	..	..	32·2
3·0	..	..	5·2	..	..	..	..	..	8·2
1·5	..	..	..	..	..	..	..	..	1·5
..	..	·4	..	4·0	·5	..	..	..	4·9
..	..	..	..	..	..	..	2·30	..	39·80
..	..	..	..	..	..	..	..	..	9·0
..	..	..	..	..	..	..	..	..	18·5
..	..	..	..	..	..	..	..	..	8·0
..	..	..	..	..	..	..	..	..	110·0
..	..	..	..	..	..	..	..	..	4·5
..	..	..	..	..	..	..	..	..	3·4
30·6	7·0	3·4	5·2	22·0	0·5	1·2	2·3	0·5	510·5
43·62 (1918-19)	12·62 (1924-25)	4·27 (1928-29)	7·14 (1916-17)	.. (1934-35)	3·49 (1917-18)	1·46 (1920-21)	5·53 (1915-16)	1·25 (1916-17)	
41·90 (1918-19)	12·50 (1924-25)	4·32 (1928-29)	7·54 (1916-17)	26·69 (1934-35)	5·64 (1918-19)	1·46 (1920-21)	5·53 (1915-16)	1·25 (1916-17)	
13·28 (1923-24)	1·02 (1902-03)	·96 (1923-24)	3·98 (1921-22)	1·91 (1911-12)	·03 (1920-21)	·77 (1914-15)	2·25 (1918-19)	·42 (1923-24)	

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CHAPTER XVIII.

Industrial and Agricultural Salt.

As shown in the Chapter on 'Properties and Uses of Salt' many modern industries depend for their development on a cheap supply of salt. Duty levied indiscriminately on all salt irrespective of its use for agricultural or industrial purposes could not be defended. From the beginning of the salt monopoly, the Government of India provided facilities for the issue of salt free of duty and sometimes even of price for industrial purposes. The following paragraphs will show how far advantage has been taken of the facilities offered in different provinces.

(*a*) PUNJAB AND UNITED PROVINCES.

In 1883-84 the Government of India first framed rules to grant concessions in respect of salt used for industrial purposes. Duty-free salt was then allowed to the N. W. Soap Company of Meerut. Now there are about 125 firms engaged in various industries who enjoy these concessions. Until recently the Managers of the firms purchased salt in the open market and applied for refund of duty on salt actually consumed by them for industrial purposes every three months. They had to give detailed statements of their stock, quantity used, purchased and left in stock and a declaration that the salt has been used for industrial purposes only. The salt had to be kept in a strong room and regular accounts maintained in the proper form. The factories were open to inspection by the officers of the Northern India Salt Revenue Department and the firm was expected to provide all facilities. Applications for refund of duty were up to 1st April 1935 dealt with by the Assistant Commissioner, Northern India Salt Revenue, Internal Branch, Agra. The number of firms allowed a rebate of duty on salt was 31 in 1931-32. It rose to 55 in 1932-33, to 86 in 1933-34 and to 125 in 1934-35. The total amount of duty refunded was Rs. 69,817|- in 1930-31 and 1,59,175 in 1934-35. Messrs. Cooper Allen and Co., Cawnpore, were paid the largest refund, *i.e.*, Rs.13,575|9|-. Out of 125 concessions, 80 concessions were for curing hides and skins, 8 for bleaching and dyeing, 15 for softening water, 3 for glazing pottery, one for steel plate manufacture, one for the cleaning guts, 1, for pickling hides and skins, 8 for manufacturing soap, one for refining oil, one for making pipes, 5 for manufacturing acid and one for tanning skins. Salt is also issued at concession rate to the refinery at Lahore. Dust or fine salt is separately stacked and issued to the concessionaire firms. The factories are priodically inspected by Salt Revenue Officers. The concessionaires are required to deposit an inspection fee of Rs. 100|- per annum.

As concessionaires began to abuse the concession, the Government of India in January 1935 imposed certain restrictions under which concessionaires were required to purchase salt educed in the manufacture of salt-petre locally from approved salt dealers only. In cases in which this kind of salt was not suitable for their needs, they were required to obtain through the Assistant Commissioner special sanction from the

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Commissioner to use full-duty-paid salt. The duty is now refunded half yearly instead of quarterly. In their application for refund of duty the concessionaires have to show :—

(1) (*i*) the balance of salt in store at the beginning of the half year ;

(*ii*) The quantity of salt purchased during the 1|2 year ;

(*iii*) The quantity of salt used during the 1|2 year and the quantity on which a refund of duty is applied for ;

(*iv*) the balance of salt in store at the close of the 1|2 year ;

(*v*) the quantity, weight and such other details of products manufactured during the 1|2 year as may be required by the Assistant Commissionêr ;

(*vi*) a declaration stating the product manufactured and the name and situation of the factory or works, and that the salt on which a refund of duty is applied for has been used *bona fide* by the applicant in the process of manufacture of such product and has not been used for any other purposes.

(2) The particulars entered in accordance with clauses (*i*), (*ii*), (*iii*) and (*iv*) of sub rule (1) shall distinguish between salt on which duty has been paid, or is deemed to have been paid, at different rates.

The concessionaires have got to keep the salt in a securely constructed store room fitted with a strong door capable of being locked, and have to maintain regular accounts. The concessionaires in the C. P., Central India, United Provinces, Bihar and Orissa, Ajmere-Merwara and Delhi are under the charge of the Assistant Commissioner, Internal Branch, Agra. Up to 1st April 1935 the Punjab and N.-W. Frontier Province too were under his charge. From 1st April 1935 the Reorganisation Scheme—a scheme for the reorganisation of the superior establishment of the Northern India Salt Revenue Department involving the separation of the technical and administrative branches at Khewra, the creation of a separate mining section of the Department and a new Preventive Division in the North-West Frontier Province and the Punjab called the North-West Preventive Division came into force. The officers of the North-West Preventive Division have also to supervise the operation of the rules for the refund of duty on salt used for industrial purposes. So only 8 districts of the Punjab, *viz.*, Ambala, Karnal, Ludhiana, Jullundur, Hissar, Hoshiarpur, Rohtak and Gurgaon have been kept under the Assistant Commissioner, Internal Branch. 19 districts of the Punjab and the North-West Frontier Province have been transferred to the jurisdiction of the officers of the North-West Preventive Division. 17 districts as mentioned under "History of Administration" in Chapter VI are being supervised by the Assistant Commissioner, North-West Preventive Circle, Khewra. The districts of the North-West Frontier Province and the districts of Attock and Rawalpindi are under the direct charge of the Assistant Commissioner, North-West Preventive Division, Kohat.

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(*b*) Bombay Presidency.

(i) *Industrial Salt.*

Since 1903 salt has been issued duty-free for industrial purposes such as dyeing, bleaching, tanning and manufacture of chemicals. Under the rules the firm enjoying the concession of duty-free salt is expected to keep a regular account of salt used by it. The salt has to be kept in a bonded or locked store which is open to inspection by salt officers. About 80 thousand maunds of duty-free salt are annually issued to mills, tanneries and chemical works. Agreements are taken from factory or mill owners who have to deposit Rs. 100|- per annum as fee for meeting the expenses of inspection. Salt is also used as a drying agent in the acetone factory at Deolali. The owner uses duty-paid salt at first and applies for refund of duty on salt actually used by him. The following statement shows the quantity of salt used for industrial purposes in recent years :—

Year.	Quantity in maunds.	Year.	Quantity in maunds.
1923-24	78,000	1929-30	82,300
1924-25	81,000	1930-31	82,600
1925-26	65,000	1931-32	82,200
1926-27	75,300	1932-33	80,800
1927-28	92,554	1933-34	80,300
1928-29	64,000	1934-35	93,215

(ii) *Agricultural Salt.*

The Bombay Government sanctioned the issue of denatured salt for use in agriculture in 1914. Up till 1923-24 salt was denaturalized by mixing it with bone dust and crude oil in the proportion of 94 : 5 : 1. As the price of denaturants subsequently increased they are now used in half the above proportions—this is, 97 : 2½ : ½. Salt is issued at cost price *plus* the cost of denaturalization. It is used as manure and is unfit for human consumption. The cost price of denatured salt is fixed by adding about 3 annas to the issue price at the fish curing yards. The agriculturist gets a permit from the Agriculture Department and produces it before the Salt Department Officer who issues the quantity specified therein. Salt is issued from the store most convenient to the agriculturist. The following statement shows the quantity of denatured salt issued for use as manure during recent years :—

Year.	Quantity in maunds.	Year.	Quantity in maunds.
1923-24	1,304	1929-30	3,584
1924-25	3,021	1930-31	2,221
1925-26	2,407	1931-32	3,607
1926-27	2,900	1932-33	5,072
1927-28	2,767	1933-34	6,463
1928-29	2,629	1934-35	5,932

This salt is chiefly used in Ratnagiri and Kanara districts.

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(iii) *Fish curing.*

In the Bombay Presidency 34 fish-curing yards are established by the Salt Department on the sea coast at the important fishing centres from Boria in Ratnagiri district to Bhatkal in Kanara district. About 80,000 maunds of duty-free salt are issued to these yards every year. In the Northern Konkan and on the Guzerat coast all attempts to start fish-curing yards have failed as fish is not salted in any large quantities in that locality, the people preferring it dried or sun-dried. Recently, however, some fish merchants in the Thana and Surat Districts have been granted the concession, on certain conditions, of using duty-free salt for curing catches of fish at sea made on the Kathiawar and Cutch Coasts. Only one merchant availed himself of this concession in 1933-34 ; he used 700 maunds of salt. The concession of using salt (on which duty is subsequently refunded) for curing and preserving fish at sea on the coast of the Thana and Surat Districts was not taken advantage of by any one during 1934-35.

In Ratnagiri and Kanara districts each fish-curing yard is in charge of a Karkun (Pay Rs. 30-80). The policy of Government is to make the fish-curing yards self-suporting and so detailed receipt and expenditure accounts are maintained. The Salt Department builds sheds, fences, etc., for the yards ; the total cost of maintaining the yards being about Rs. 70,000 per annum. Salt is at present supplied to the yards by contractors from the Uran factories at the rate of annas 9 for Ratnagiri district yards and at annas 10 for the Kanara yards. The issue price to the yards was Re. -|14|- per maund. From 1st October 1933 it was raised to Re. 1|- which is the current rate. The rate is fixed allowing for cost price, establishment and other charges, so that the yards work at a small profit. At least 1,000 maunds per annum must be required by a yard before sanction to open a new yard is accorded.

The yards are constructed near the sea beach. A yard is a salt store capable of holding a year's requirement and has a big compound where fish are cured by wet and dry processes. Fishermen bring fish split, cleaned and assorted ; they are counted by the Karkun and weight is calculated. When salting is done by the wet process, one maund of salt is allowed for every three maunds of fish ; and when by the dry process, one maund is allowed for every five maunds of fish. The Ratnagiri fishermen are industrious and enterprising and the fish curing is in their own hands. Unlike the Madras curers they do not rely on wealthy middlemen. In Kanara conditions are very similar to Malabar—that is—the fishermen are lazy and largely in the hands of outside financiers. The Madras fishery experts, who visited the Bombay yards some years ago, reported very favourably on the methods of working and recommended their adoption in the Madras yards. In 1934-35 the total quantity of fish brought to be cured was 3,01,426 maunds and 78,924 maunds of salt were issued.

The control of the fish-curing yards has been transferred to the Government of Bombay with effect from the 1st July 1936.

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(*c*) SIND.

(i) *Industrial Salt.*

Maurypur salt is issued free of duty to tanneries approved by the Commissioner in Sind. The tanners pay duty before the salt is issued to them and then obtain refund subsequently on the actual quantity of salt used. They are required to keep accounts and to allow their accounts and their stocks to be inspected at any time by officers of the Salt and Excise Department.

9 tanneries made use of the concession in 1932-33, 10 in 1933-34 and 12 in 1934-35.

The quantities used were 6,782 maunds in 1932-33 and 8,884 maunds in 1933-34 and 6,900 maunds in 1934-35.

(ii) *Fish-curing yards.*

The existing rules which have been in force since 1883 permit the issue of salt at a concession rate of 8 annas a maund to the fish-curing station at Shamspir near the Maurypur Salt Works. No advantage has been taken of this concession since 1919 and most of the curing is now done in Karachi with salt which has paid the full rate of duty.

(*d*) BENGAL.

The Government of Bengal have issued similar rules providing for the issue of duty-free salt for industrial purposes. In the case of glazed stone-ware industry the salt is mixed with tar in the Government salt golas in the proportion of one seer of tar to one maund of salt and is then issued free of duty. Under Government of Bengal Finance Department (separate Revenue) Notification No. 170 S. R. of the 5th March 1935 denaturalisation of salt free of duty is also permitted for the manufacture of a preparation for the preserving and tanning of hides. Two lbs. of napthalene powder and 1 lb. of sodium thiosulphate are ordinarily mixed with one maund of salt for the purpose of forming the mixture. In the case of soap, tanning, alkali and hydrochloric acid industries, salt is not issued duty-free, but a refund is allowed quarterly on the actual amount used. During 1932-33 and 1933-34 duty was refunded on 77,695 and 81,345 maunds of salt respectively.

There is no fish-curing yard in Bengal. In olden days (in 1875) a fish-curing yard was established at Goalundo, but it was closed in 1880, as the experiment did not prove a great success.

(*e*) MADRAS PRESIDENCY.

(i) *Industrial Salt.*

Under the rules first framed by the Government of India in 1884 for the issue of salt duty-free for use in manufacture, salt was required to be issued from the factory in sealed bags and was stacked in a secure store room, the key of which was in the custody of the Manufacturer or the Manager of the works. The bags were not allowed to be opened before the salt was actually required for use and the manufacturer had to maintain correct accounts of receipts and issues. The accounts and the salt in store were open for inspection by any Magistrate or by any officer of Police not below the rank of an Inspector or by an officer of the Salt, Abkari and Customs Department not below the rank of Sub-Inspector. In 1899 it was considered necessary to depute a Petty Officer at the expense of the industry concerned to supervise the issues of salt. Later, in 1901, an annual fee of Rs. 300 was levied to cover the cost and trouble of inspections and other departmental expenses. This fee was reduced to Rs. 100 in 1907 and in 1918 the employment of a Petty Officer was made optional. The rules were revised in 1927 and under the revised rules an applicant for supply of duty-free salt has to submit a separate application and pay the prescribed fee of Rs. 100 in respect of each of the factories or works for which the supply is required and also execute a bond and agreement if the application is granted. Very little advantage was taken of the concessions of duty-free issues for manufacturing purposes before 1900, only 14 maunds being issued in 1886-87, 10 in 1887-88 and 10 in 1892-93. The demand for duty-free salt has, however, gradually increased. The following statement gives the issues of salt for industrial purposes in old and recent years :—

Year.	Maunds.	Year	Maunds.
1900-01	600	1931-32	24,996
1910	4,602	1932-33	29,138
1921-22	13,998	1933-34	71,240 (including Mysore).
1928-29	23,224		
1929-30	30,660		
1930-31	34,294	1934-35	84,666

During 1934-35 about 115 industrial concerns availed themselves of the concession. The issues were distributed as under :—

58,024 maunds for tanning hides and skins, 840 maunds for bleaching cotton and silk goods and 39,992 maunds for miscellaneous purposes such as manufacture of hydrochloric acid, soaps, etc. The balance, *viz.*, 21,810 maunds, was issued to industrial concerns in Mysore State.

(ii) *Fish curing.*

Before the suppression of the use of salt earth, the fishing classes were accustomed to cure with earth salt the fish which they could not sell fresh. To prevent the heavy loss entailed on the curers by the purchase of duty-paid salt and to obviate the injurious effect of the supply of badly cured fish, it was decided in 1875-76 to supply salt duty-free at a little over cost price for curing fish at one place in each coast district. In subsequent years the operations were gradually extended. From 1st April 1924 the control of the fish-curing yards was transferred to the Director of Fisheries working under the Madras Government. Since then, the Fisheries Department has made its own arrangements to buy salt from the cheapest market, transport it to the yards and supply it to the curers and it bears the losses, if any, resulting from the transactions. The issue price of salt was fixed at a uniform rate of 6 annas a maund in 1874. From the next year, however, different rates were introduced for different areas varying from 6 annas a maund till 1917. The rate was made uniform at 10 annas a maund in 1918 and in 1924 when the Local

Government took over the management of the yards, it was raised to Rs. 1-4-0 a maund in order to minimise the recurring losses on the working of the yards.

The control of the fish-curing yards in the Presidency these days is under the Director of Fisheries and the Fisheries Department makes its own arrangement to purchase salt from the cheapest market, to transport it to the yards and to supply it to consumers. Government, however, agreed to supply salt required for distribution in the yards free of duty. Up to 1931-32 Government purchased one or two heaps from the Modified Excise licensees solely for supply to the Fisheries Department in instalments, but this entailed loss to Government in that wastage had to be borne by the Department. So in 1931-32 instructions were issued that the Fisheries Department should make its own arrangement for the purchase of salt from Excise licensees in factories where manufacture on behalf of Government is not carried on.

Salt required for distribution is now supplied by the Government of India free of duty. All the important fish-curing yards are on the West Coast and the salt required by these yards is transported from the Tuticorin Salt Factories. The following statement shows the issues of salt for fish curing in the Presidency :—

Year.	Issues of salt in lakhs of maunds.
1919-20	2·53
1920-21	2·96
1921-22	2·58
1922-23	2·31
1923-24	2·79
1924-25	3·46
1925-26	2·56
1926-27	1·41
1927-28	2·22
1928-29	3·01
1929-30	2·21
1930-31	1·56
1931-32	1·71
1932-33	1·60
1933-34	1·84
1934-35	2·13

About 102 yards were at work in the Presidency in 1934-35. Officers of the Salt Department used to inspect the fish-curing yards, but this practice was discontinued from 1932-33. Now all cases of theft or illicit removal of salt from fish-curing yards are detected by the Fisheries Officers and are reported to the officer in charge of the nearest Police Station or the Salt officers concerned.

Mysore State.—The issue of duty-free salt to industrial concerns in Mysore State started in 1923. It was limited to 14,000 maunds. In 1931-32 the rules in force in the Madras Presidency for issue of duty-free salt for industrial purposes were amended so as to make them applicable to industrial concerns in Indian States for which the Government of India might sanction the supply of duty-free salt. The State is

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required to adopt sufficient safeguards in order to see that the concession is not abused. 10,948, 16,580, 19,044, 22,400 and 21,810 maunds were issued in 1930-31, 1931-32, 1932-33, 1933-34 and 1934-35 respectively. This salt is used for tanning hides and skins, bleaching cotton and silk goods and for soap factory at Bangalore.

(*f*) BURMA.

(i) *Industrial Salt.*

The concessions for industrial salt have been allowed in Burma since 1920 only. Rules have been framed providing for the issue of duty-free salt in sealed bags for the use of approved manufacturers on payment of a fee of Rs. 100. The salt is verified by a Salt Revenue Officer on arrival at the works and is stored in an approved locked compartment, the key of which is kept in the personal custody of the manufacturer or works manager. Departmental instructions have been laid down regarding the check and control of salt so issued and the nature of manufacture to which this concession may be applied. The manufacture of hydrochloric acid, alkali or paper and the salting, curing and preserving of hides and skins have been given as examples of industries which *prima facie* have a claim to special treatment, but the concession is not to be applied to the case of salt used for flavouring or preservative purposes in articles of human consumption. The following quantities of salt have been issued duty-free since the introduction of this concession in July 1920 :—

Year.	Mds.	Year.	Mds.
1920-21	1,085	1928-29	18,585
1921-22	630	1929-30	16,017
1922-23	7,482	1930-31	8,203
1923-24	7,928	1931-32	14,094
1924-25	18,204	1932-33	23,608
1925-26	17,003	1933-34	36,164
1926-27	6,980	1934-35	40,650
1927-28	22,291		

The only uses to which duty-free salt has so far been put are (1) Chemical manufacture (hydrochloric acid, and a patent disinfectant), and (2) hide salting or curing.

(ii) *Fish curing.*

The concessions allowed to the fish-curing industry in other parts of India have never been extended to Burma and all salt used for fish curing pays full duty. Further, very large quantities of salt fish are regularly imported into Burma from the Straits Settlements and Madras, notwithstanding Burma's long coast line and important rivers. The reasons for this are set out in the following extract from Mr. Ashton's report of 1890—"The opening of fish-curing yards in which salt could be supplied duty-free as on the coasts of India, would, if such a measure were practicable, allow of Burmese fisheries competing on equal terms with foreign countries in the markets of Burma, but a glance at Map No. 1 and an examination of the district maps, will show that this is not possible. Fishing is carried on along the whole line of the coast and

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over the whole of the central part of Lower Burma. During 1889-90 there were 1,053 principal fishing centres in sixteen districts, 154 sea fisheries in nine districts and 899 inland fisheries in twelve districts. On the sea coast, many fisheries are situated in most difficult positions on islands and in mangrove swamps, and inland, even in the case of the largest factories, each extends over 20 and 30 miles of river, channel, creek and swamp. Fisheries do not exist in proximity to salt works and there are no large fishing centres which supply the larger portion of the market demand. The *ngapi* fisheries on the sea coast of the delta are difficult of access and the interior of the delta is a maze of inland fisheries. In Eastern Tenasserim fishing is carried on in still more difficult localities among the islands of the Mergui Archipelago. If they were established, the number of the fish-curing yards would have to be very numerous to be of any practical value to the fish-curing industry as a whole and the cost of supervising establishments and of the supply of salt would be excessive. A limited number of yards would have no effect on the industry generally nor on the market values of fish, as only a small proportion of the fish supply of the country would be affected and prices would not be influenced. Under all these circumstances the successful establishment of fish-curing yards in Burma is impracticable ''. As regards the import of salt fish, it was stated that '' Burmese fishermen confine their attention to a great extent to the preparation of pickled fish and fish paste, two valued necessaries of life in Burma, while the demand for dried salt fish, a luxury, is principally met from abroad ''. These views have often been criticised but in the end have always been accepted as sound. It has been estimated that the annual cost of establishing fish-curing yards both on account of out-of-pocket expenditure and drawback on salt revenue would amount to over Rs. 2 lakhs.

The Burmese fishermen confine themselves to preparing pickled fish. The fish trade which annually averaged about 1,70,000 maunds followed a gradual decline from 1928-29 due to general economic depression. In 1932-33 it was 65,080 maunds only. The cause may be attributed to additional duty of 5 per cent. *ad valorem* imposed and to a surcharge of 25 per cent. imposed from 30th September 1931 on the duty rate of Re. 0-7-6 per maund. These rates continued up to 31st December 1932. From first January 1933 the duty on dry salted fish was revised to a standard rate of Rs. 3-8-0 per cwt. on imports from foreign countries and Rs. 1-8-0 per cwt. on imports from British colonies. Over 90 per cent. of fish is imported from the Straits Settlements.

It will not be out of place to point out that the Industrial Commission (1915) considered the arrangements of fish-curing yards in the Madras Presidency very satisfactory. They thought that there was an immense future before the Indian fisheries and recommended Bombay and Burma to follow the example of Madras. The Indian Taxation Inquiry Committee (1926) recommended that the present concessions with regard to issue of salt for fish curing might be continued provided it did not result in any cost to the Imperial Government in excess of the duty remitted. The Committee suggested that the concessions should be extended to all other provinces as well. The Committee considered the system of issue of duty-free salt for textiles and other industries in various provinces satisfactory. As regards agriculture, they recommended the extension of the Bombay rules to other provinces.

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CHAPTER XIX.

History of Salt Revenue in India.

Salt Revenue in India has had a chequered career. A detailed history of salt revenue would form a book by itself, consequently the salient features of its history are given in an outline only. The salt revenue followed different lines in different provinces up to 1870 and so up to the seventies it will be studied province by province. Since after this period Government adopted a general policy, all provinces will be advantageously studied together.

A.—UP TO 1870.

(*a*) Bengal.

Under the Mohammedan rule, a revenue was realized by means of imposts on the privilege of manufacture and by transit duties on its transportation from the places of manufacture to the interior of the country. The duties were generally farmed and according to Sir John Macpherson, "the farmers had the entire salt trade in their hands". The coming of the English on the scene practically coincided with the fall of the Moghal power. The Diwani (or the right to levy tax) of Bengal, Bihar and Orissa was granted to the East India Company in 1765. With the grant of Diwani the Company got influence and power and established its economic prestige long before Political power came into its hands. In 1765 Lord Clive, the then Governor General, wanted to establish a society of trade for Salt, Betelnut and Tobacco and to monopolise the sale of these articles, but this was not approved of by the Court of Directors. The Company, therefore, substituted excise for monopoly, but as the revenue was falling, Warren Hastings was driven to tighten up the reins of salt administration and adopt the monopoly of manufacture. All salt was delivered to Government at a fixed price and Government sold it at a fixed price. This did not improve revenue and in 1780 Warren Hastings introduced the Agency system. Under this system a Comptroller and several civil officers of rank were appointed as salt agents of the Company. Salt was manufactured by the manufacturers called "Molunghees" under the directions of the agent and was sold to him at a fixed price. The agent stored salt and distributed to wholesale dealers at a fixed price, the difference of Rs. 1|2|0 to Rs. 1|8|0 a maund constituting salt revenue to the Company. This improved revenue which as Mr. Plowden says rose from £8,427 in 1780-81 to £4,57,687 in 1786-87. According to Mr. Plowden there were two reasons for the institution of this monopoly, (1) Improvement of Revenue, and (2) Emancipation of 'molunghees' from the clutches of the Indian capitalists. The first purpose was achieved, but the condition of the molunghees did not much improve. Attempts were made to improve their condition by introducing a surplus system under which a higher payment was made for the salt manufactured by them over the quantity stipulated. The system was, however, abolished as the stocks in hand increased immensely. Later on Lord Cornwallis started a system of auction sales instead of selling at fixed price. This, however, gave rise to a sub-monopoly of salt in the hands of Indian capitalists and the consumer suffered a lot.

Salt laws of those days were of unusual rigour. Besides the actual illicit manufacturers, the zamindars on whose lands illicit manufacture

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of salt took place were held responsible. This was under the 1778 Salt Rule and the Regulation of 1793. Smuggling and illicit manufacture of salt were, however, common. The Company's monopoly was very unpopular. The Court of Directors in all their Despatches and orders took a different view and wanted to cheapen salt. Up to 1818 the import of English salt was prohibited and till 1830 was subject to a high import duty and penal bonding regulations, which evoked a powerful agitation from the English manufacturers. The result was that the Committee of Lords in 1830 and the Select Committee of the House of Commons, 1832, went into the East India Company's affairs. The Company's Charter was renewed in 1833, but the Charter remained a dead letter so far as the closing of the commercial business of salt monopoly was concerned. Allegations of dear and adulterated salt were made before the Committees. They, however, did not abolish the monopoly since there were then no other means of raising the revenue it yielded. In 1836 a Select Committee was appointed to enquire into the salt supply of British India. They recommended that the monopoly should at least be reduced to a monopoly of manufacture and stated that they hoped to see it replaced by a combined system of Customs and Excise under which other parts of India might get a share of the supply. As a result, the system of auction sales was abolished and Warren Hastings' system of fixed price sales of unlimited quantities reverted to.

The quantity sold under the Company's monopoly amounted to about 1,80,000—1,90,000 tons. The duty on salt was abolished in England in 1825 and hence the salt industry there received a great impetus and foreign salt began to come to Bengal mostly as keel ballast. The cost of production of salt in Bengal was very high, as much as Re. 1 a maund, and so foreign salt began to come in greater and greater quantities. In 1843 the Court of Directors laid down the principle of price fixation under which the net salt revenue was to be maintained at its present amount, the duty to be imposed not to exceed the average rate of net profit of the Company's monopoly for the previous ten years.

Lord Dalhousie in 1851-52 recommended reduction of the selling price of local salt in order to check the rising tide of foreign imports. The Charter of the Company was renewed in 1853 and under the new Charter the Company was ordered to give up all commercial business and the manufacture and sale of salt were made free but subject to an excise. The position of the monopoly was shaky and a special officer, Mr. Plowden, was appointed to report on the salt industry. He recommended excise, but monopoly, being a hardy growth, vanished only gradually. Excise system could not stand in competition with imported salt. Imports increased enormously. The duty which was Rs. 3|4|0 in 1817 was reduced to Rs. 3 in 1844, to Rs. 2|12|0 in 1847 and to Rs. 2|8|0 in 1849, but was again raised to Rs. 3 after the Mutiny. Mr. Plowden recommended Rs. 2. The local industry gradually lost ground. Agencies were closed in 1863 and the 'molunghees' suffered great hardships in the Orissa famine of 1866. The Chesire salt by its superior quality and cheapness soon ousted the local product. The manufacture of local salt remained subject to Excise till 1898 when it was prohibited altogether. During the War days (1914—1918) attempts were made to revive the local manufacture but failed. A system of retail sales at reduced prices from shops established on behalf of Government in areas peculiarly exposed to

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smuggling existed in Bengal for many years, but was abolished in 1862, when the full rate of duty was for the first time levied uniformly throughout the province. After the Mutiny the duty was raised to Rs. 3 in 1859 and further to Rs. 3|4|0 in 1861. Subsequent history of Salt Revenue in Bengal is given in the general section.

(*b*) MADRAS.

There was very little salt revenue in Madras before 1805. The manufacture was either farmed out or managed by officers of Government upon what system the records do not clearly show. Sometimes the pans were farmed out, sometimes revenue posts were established and transit duty levied, and sometimes the produce was divided. On an average the gross revenue from salt prior to the monopoly is said to have been about Rs. 2,20,000. It was in 1802 that the East India Company by Regulation XXII reserved to itself the exclusive privilege of manufacturing salt. The Government established a monopoly of manufacture and sale of salt by Regulation 1 of 1805. This was extended to Malabar and Kanara in 1807. According to the Madras Salt Commission of 1876, "the salt revenue in Madras can hardly be said to have a history before the establishment of the Government monopoly". Mr. Plowden in his report on salt industry in 1856 mentioned that the monopoly was designed to meet the expenses of new Judicial establishment. In the beginning, a general agent was appointed at the head of Collectors, but in 1808 the Collectors were placed under the Board of Revenue on a Commission basis. Production by manufacturers was subject to Government control and they had to sell all salt to Government at a fixed price. The Government then sold it to dealers at a profit. The sale of salt to any persons other than Government Collectors was made illegal. The Zamindars who manufactured or connived at clandestine manufacture of salt on their land were also liable to punishment. In the beginning the Company opened warehouses in many parts of the country so as to enable people to purchase salt at Government prices.

In 1809 the price including cost of production, duty, etc., was Rs. 105 per garce (120 maunds). It was reduced to Rs. 70 per garce in 1820. It continued at this rate till 1828 when it was raised to Rs. 105. This rate continued till 1843. In 1844 the Government of India abolished the transit duties and raised the price of salt to Rs. 180 per garce or Rs. 1|8|0 a maund, but the Court of Directors reduced it to Re. 1 a maund. In Malabar and Kanara the prices were at a higher level. Sales of Government salt in 1807 were 34,14,560 maunds and in 1870 65,01,638 maunds. Imports of foreign salt were prohibited in Madras upto 1818. Then they were permitted, but an import duty of Rs. 3 a maund was fixed. This was reduced to twelve annas under orders of the Court of Directors in 1851. The foreign salt, however, did not find favour with the Madras consumer and the salt magnates of England kept on agitating against the Madras Salt monopoly. The outcome of this agitation was the appointment of the Madras Salt Commission of 1876.

An abundant quantity of spontaneous salt formed in marshy swamps and earth salt was produced in saliferous tracts. In Bellary and Kurnool a tax was levied on the manufacture of earth salt under the head of 'Mohturfa'. The 'modas' or hillocks were worked by animals or manual labour and were classed and manufacture taxed according to the number of men or cattle employed on each ' moda ' or mound of earth put to use. The tax was on a licensing basis. In 1869 the manufacture of earth salt was permitted in selected places only, compensation being paid to those who agreed to stop manufacture. The Madras Salt Commission recommended stringent measures and total suppression, but these recommendations were not adopted.

A redeeming feature of the Madras salt monopoly as compared to Bengal was that it did not contribute to the deterioration of the quality of the salt, very probably because of the absence of the institution of auction sales, and its accompaniment, the sub-monopoly. The consumer was thus supplied with an article which was comparatively cleaner. Here any one could purchase salt from Government stocks at a fixed price. The monopoly system continued till after the Charter of 1853 when Mr. Plowden was appointed Salt Commissioner to enquire into the system of salt administration. According to him monopoly was defended only on the ground that the same amount of revenue could not be raised so cheaply and with so little inconvenience to the community in any other manner. He recommended Excise—a system of licensing in suitable localities. The Madras Salt Commission of 1876 also recommended Excise. They said, " We regard it as the most hopeful means of giving to the Madras Presidency the share in the trade for the supply of other parts of India and Burma and adjacent countries which its natural advantages and geographical situation should enable it to command. We therefore recommend that steps be taken for the introduction of Excise ". Excise system, however, was only gradually introduced. By 1877, 87 per cent. of salt was produced under Excise system and sold from 6 to 14 annas a maund. Some monopoly factories, however, still continued to secure a reserve of supply against shortage and secondly as a safeguard against undue fixing up of prices by manufacturers. The Modified Excise system, under which the licensee ordinarily manufactures for his own sale, but may be required at any time before the beginning of the season to sell the whole or a portion of his salt to Government at a fixed price, was also in force.

For many years the price of salt under the monopoly system was fixed at Re. 0-2-0 a maund. In 1877 it was at Re. 0-3-0 per maund which continued till 1905. Government stocked salt to control the prices which they wanted to keep as low as possible. Up to 1844 the duty was not kept separate from the price. The rate was then amalgamated and quoted at so many rupees per garce. As already stated the rate in 1844 was kept at Re. 1-0-0 a maund. It was raised to Rs. 1-2-0 in 1859, to Rs. 1|6|0 in 1861, to Rs. 1|11|0 in 1866, and to Rs. 2 in 1869. About this time the Government of India adopted a policy of equalization of salt duty throughout India which is dealt with in the general section of this chapter.

(c) BOMBAY.

The salt revenue administration engaged the attention of the authorities in Bombay much later than in other provinces. According to Mr. Peddar, an officer on special duty, " A regular Excise upon salt in Bombay dates only from 1838 ". Previous to 1836, the Collectorates of

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Ahmadabad, Kaira, Bombay, Surat, etc., had different systems of management and collection of salt duty. Some works were owned by Government which sold the salt. Government rented some works and got rent. A duty was levied on the produce of some private salt works, sometimes a Customs duty was levied on the import and export of salt by sea and transit duty was levied in land. Sometimes a Land Revenue was assessed on some pans and a quit rent was levied on others. The whole scheme was incomprehensible—the revenue realised under these different system was small, being Rs. 2,35,242 only in 1836-37. The idea of establishing a salt monopoly was first mooted about 1816, but the Court of Directors considered the proposal premature in the then unsettled state of the Bombay Presidency and did not agree to it. Mr. Bruce, a member of the Bombay Customs Committee, suggested the abolition of transit and town duties in favour of an excise levy of Rs. 0|6|4 on salt in 1825. The Government of India, however, did not agree to the abolition of transit duties. The Customs Committee then recommended an excise duty of Re. 0|8|0 a maund on salt to make up for the loss of revenue consequent on the abolition of transit duties. This was put in force by Act 27 of 1837 under which pans were licensed, illicit manufacture penalized, transit duties abolished and an excise duty of Re. 0|8|0 levied on salt before its removal from works. The amount realised from salt duty at that time was about Rs. 14 lakhs. The town duties were abolished in 1844 and the duty enhanced to Re. 0|12|0 a maund. The effect of these salt duty laws was exceedingly beneficial to the inhabitants of the Presidency. Mr. Peddar in his report of 1870 said, " A simple, indirect and far from oppressive tax was substituted for a system of taxation from the times of the Mahrattas, which formed an intolerable burden upon trade and industry and in the words of Plowden was so full of inequalities, anomalies and complications that it would be almost vain to inquire from what objections and abuses it was even free ". Later on, the Act of 1837 was replaced by Act 31 of 1850 for the better protection of Salt Revenue. Illicit manufacture was prohibited under its penal provisions. Preventive lines had already been raised in 1836 dividing Gujarat from Kathiawar and Marwar so as to keep out of Gujarat, northern salt and that naturally produced in the Runn. Preventive lines against the Portuguese territories were raised in 1840. Mr. Plowden in 1856 recommended reduction of duty to Re. 0|8|0. He considered that the higher the duty, the greater was the temptation for smuggling. According to him reduction of duty was the only key to stop smuggling and illicit traffic in salt. The Government of India, however, raised the duty to Re. 1 in 1859 and then to Rs. 1|4|0 in 1861 to meet the post-mutiny deficits in finances. The duty on salt in Bengal at this time was as high as Rs. 3|4|0. The Government of Bengal believing that Bengal was forced to subscribe much more than its due and legitimate share to the Imperial Revenues pressed for equalization and raising of duty in Bombay and Madras. Hence in 1864 the duty was raised to Rs. 1|8|0. The revenue increased and the Government of India with a view to equalize the duty all over India pressed for a further increase. Further history after the seventies is given in the general section.

Madras dealt with the problem of salt manufactured in the Non-British European territories, *viz.*, French Settlements, by treaties and compensations, but Bombay even now allows its Non-British territories to manufacture salt against which a preventive line still operates.

(*d*) BURMA.

Under the Burmese regime, duty on salt was levied except in Shwebo and Lower Chindwin Districts. The Burmese levied a tax of 7 annas for the season on every pot of which a kiln was composed and also a 'ghaut' tax or transit duty of 4 annas per 100 viss at the 'ghaut' from which the salt was embarked. According to Mr. Plowden salt was manufactured in Burma, but export to Bengal was stopped. The manufacture was free subject to an excise which was levied per earthen pot or iron cauldron. Duty in various parts varied from Re. 0|8|0 to Re. 1 per earthen pot and from Rs. 2|8|0 to Rs. 5 per iron cauldron. The gross revenue in 1853-54 was Rs. 14,263.

Between 1876 and 1882 duty on salt was levied under the Lower Burma Land and Revenue Act which empowered the Chief Commissioner to levy a duty on manufactured salt not in excess of the Customs duty in force at that time.

The Burma Salt Department was formed after the annexation of Burma by Lord Dufferin, when a duty of Re. 0|3|0 a maund was levied. From 1854 to 1888 the Customs duty was 3 annas per maund ; excise duty the same, while the composition rates varied from Re. 1 to Rs. 5 per cauldron. At the suggestion of Mr. Ashton of the Northern India Salt Revenue Department deputed to report on the Burma Salt Industry, the Composition duty levied as a composition fee on manufacture was raised, but it did not come to the level of the Customs duty with the result that the local industry flourished and foreign imports declined. From 1888 to 1916 the Customs Duty was Re. 1 with various rates of Composition duty, all well below Re. 1 per maund. In 1902 the Excise duty in Hanthawady and Bassein districts was reduced to 8 annas, this low rate being in later years extended to Myaungmya, Tavoy, Mergui, Amherst and Kyaukpyu. In 1911, the Excise duty was raised to 10 annas, in 1914 to 12 annas and in 1916 to Re. 1, the Excise duty in the last mentioned year being raised to the level of the Customs duty, namely, Re. 1|4|0 and thereafter the Burma rates followed those in India. The composition duty rates in Upper Burma are still lower. The cost of production is high and if full duty were levied, the industry could not get on at all.

Duty on imported salt was first levied under Act 30 of 1854. A Customs Duty of Re. 0|8|0 a maund was leviable on salt imported by sea into any part of Arakan, Pegu, Martban, and this was reduced to Re. 0|3|0 in 1865. By Indian Tariff Act, 1875, the rate of duty was kept at Re. 0|3|0 and was raised to Re. 1 in 1888. Now Import Duty in Burma and Bengal is levied under Section 3 of the Indian Tariff Act, 1894, at the rate at which Excise Duty is levied under Section 7 of the Indian Salt Act, 1882.

(*e*) NORTHERN INDIA.

In Pre-British days Northern India got its salt either locally by lixiviation of salt earth or from the Salt Range mines and quarries or from the Rajputana Salt Sources. The Mohammedan Rulers raised revenue from salt by means of imports on the privilege of manufacture or by transit duties known as "sayer" on its transportation from places of manufacture to the consuming markets, which were levied from

Muhammadans at the rate of 2½ per cent. *ad valorem* and from Hindus at 5 per cent. The East India Company got the Doab District in 1801. The earliest regulation for the collection of Customs taxes (which included salt duty) in Upper India was No. XXXVIII of 1803 and under that Regulation salt was taxed according to quality at varying rates. The Company first set up a system of monopoly by agents who advanced money to licensed manufacturers on the stipulation that the salt made would be delivered to the Company at a certain price. Salt was then sold to merchants by public auction. This system prevailed only for a few years. By 1804 it had been replaced by imported salt and on salt produced in the conquered districts. This duty was collected at Custom Houses which had been established throughout the North-Western Provinces for the collection of the Inland Customs duties which had been imposed on various articles in substitution for the native system of 'sayer'. In 1810 in place of the uniform duty of 12 annas a maund variable duties were imposed, *i.e.*, Re. 1 on Lahori, Sambhar and Didwana salt, 12 annas on Bharatpur, 8 annas on Gurgaon and 4 annas on other kinds of salt. This system of taxation, namely the levy of duty at the principal Inland Customs stations, gave rise to great abuses and between 1823 and 1834 the Inland Custom houses and chaukis were abolished and their place taken by a line of chaukis on the frontier, the manufacture of alimentary salt from salt earth or well brine being prohibited in the interior of the province.

A double line of Customs posts on the frontier and on the Jumna was established in the Delhi Territory. At the suggestion of Sir Charles Trevelyan, the Government of Lord William Bentinck abolished the transit duties the evils of which were well recognised and substituted for them a system of import and export duty to be collected on the North-West Frontier of British Territory within which manufacture of alimentary salt was prohibited. This is how the great Inland Customs Line started. In 1843 the duty on imported salt was fixed at Rs. 2 per maund. The whole establishment was concentrated on the single line divided into Beats. The line began from the Himalayas and ran parallel to the river Jumna along its right bank through the districts of Ambala, Karnal, Delhi and Gurgaon in the Punjab and to the U. P. districts of Muttra, Agra and Etawah. Thence it was carried along the southern Frontier of Allahabad and Mirzapur Districts to the Son River where it ended. A branch line ran from Ballbagarh in the Delhi district along the northern border of the Jhajjar territory by Hansi and Hissar to Fazilka on the Sutlej to tax salt from Rajputana. The Revenue which was about rupees 22 lakhs in 1823 rose rapidly to Rs. 47 lakhs in 1843. On the annexation of the Jullundur Doab, the branch line from Delhi to Sutlej became the main line ; when the Punjab was annexed after the Sikh Wars in 1849, it was extended up the Sutlej to a point in the Indus opposite Mithankote. Under Sikh Rule, salt was one of the 48 articles liable to Customs, town and transit duties. Mines and quarries had been farmed out and the farmer disposed of his salt as he liked. His price and transit duties were very high. Lord Lawrence in his evidence before the Select Committee on East India Finance in 1873 deposed that under the Sikhs the levy amounted to Rs. 1|8|0 a maund. The British Government abolished the transit duties and fixed Rs. 2 a maund as price and duty. The quarries in Kohat were given to local chieftains on payment of tribute. Very light duties of Re. 0|2|0 to 0|4|0 a maund were levied on Kohat salt.

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The Commissioners of the Rawalpindi and Multan Divisions, were in charge of revenue and preventive lines along the Indus and Sutlej respectively. In 1855-56 certain portions of the Central Provinces were brought within the line and a uniform duty of Rs. 2|8|0 was fixed for all salt crossing the line. The duty was raised to Rs. 3 in 1861. In Bengal it was Rs. 3|4|0 at this time.

About this time (1867) the Inland Customs Department was at its zenith. The great Customs Line was 2,500 miles long and stretched from Torbela on the Indus to Mahanadi in the then Sambalpur district of Central Provinces (now in Bihar and Orissa) and was guarded by an army of 13,000 officers and men at an annual cost of Rs. 16-17 lakhs. The line consisted of a huge barrier of an impenetrable hedge of bushes and undergrowth reinforced by stones and boulders and in some places even by masonry work. The Commissioner, Inland Customs Department, in his Administration Report for 1869-70 said, "The line divided into 110 beats, each presided over by a Patrol or an Assistant Patrol, is watched from 1,727 guardposts by some 10,000 men and non-Commissioned Officers. A very perfect system of patrolling exists and except in some very wild portions of the Central Provinces (where tigers bar the way alike to smuggler and Customs Officer after dark) goes on with unabated vigilance night and day". The average quantities of the different kinds of salt which crossed the line were :—

	Maunds.		Maunds.
Sambhar	5,60,759	Bombay	3,38,403
Pachbadra..	2,36,533	Madras	1,57,645
Didwana	3,09,181	Saltpetre..	25,872
Bharatpur	11,62,434	Others	26,382
Salumbha (Nuh)	1,58,693		
Sultanpur	6,80,233	Total ..	36,56,135

In 1869-70 60,58,101 maunds of salt and 20,61,067 maunds of sugar crossing the line were taxed and the gross realization amounted to Rs. 1,68,40,752. Remnants of old bungalows near the line are still found near Fatehpur and Ara. The essence of the salt revenue system prevailing up to 1870 in Northern India was the levy of duty on all salt imported into British India and suppression of manufacture of salt within it. Lord Lytton in 1873 attributed the existence of the line to the variations in rates of duty. Sir John Strachey in his budget speech in the Legislative Council on the 27th December 1877, also described its *raison d'etre* in terms analogous to Lord Lytton's, *viz* ; "in order to bring under taxation the salt imported from Rajputana into Northern India, and to shut out salt taxed at a lower rate".

B.—FROM 1870 TO DATE.

India as a whole.

In 1870-71 the consumption of salt was about 2,30,00,000 maunds and the net revenue about £5,700,000. It was, however, recognised on all hands that the system of realizing revenue through the line was inherently unsound, cumbersome and a serious hindrance to traffic. The cost of collection was excessive (amounting to 13 per cent. of the gross collections), the price of salt in the United Provinces was undesirably high, while the line was obviously a serious hindrance to trade and a source of suppression. The administration of the line and the control of the salt works in Rajputana were, therefore, taken over from the Local Governments by the Governor General in Council in the Finance Department. The great Sambhar lake in Rajputana was obtained on lease from the Jodhpur and Jaipur States with the object of increasing the supply of salt and reducing its price by skilled supervision at the source and improved communications between it and the markets. Duty was, however, still levied on the lake salt as it crossed the line and the establishment at the lake confined itself to the supervision of manufacture, the prevention of smuggling and the conduct of sales. An attempt was also made to revive manufacture in the interior ; two groups of works being opened in the Jaunpur and Unao districts of the United Provinces. The attempt failed, as the cost of manufacture was so high and the salt so inferior to Bharatpur, Sambhar and Sultanpur salts that great difficulty was found in disposing of it. The Jaunpur salt in fact had to be destroyed. The eastern portion of the line was soon afterwards abolished, Berar and Central Provinces being permitted to obtain their salt from Bombay and Madras.

The lease of the Sambhar Lake having proved successful, it was decided to proceed with the removal of the Customs Line. Efforts were made to equalize duty throughout India. The duty in Bombay and Madras was accordingly raised to Rs. 1|13|0 from Rs. 1|8|0 in 1869. Treaties were negotiated with Indian States and the Customs line was ultimately abolished from Leiah on the Indus to Khandawa in Central Provinces with effect from 1st April 1879. The Finance Member in 1880 said,

> " The Inland Customs Line on the enormities of which I have so often dilated, finally disappeared at the commencement of the present official year. When I think of this abominable barrier which was likened to the great wall of China stretching 2,000 miles across the whole of India, so that if it had been put down in Europe, it would have reached from London to Constantinople, with the countless evils that it entailed, I find it difficult not to begin my old expressions of indignation. However, it is now dead and I congratulate your Excellency and the country on the fact. By its disappearance we have saved £1,00,000 a year ".

Amendment of the Law necessitated by the abolition of the Customs Line was effected by the enactment of the Indian Salt Act of 1882. The Inland Customs Department was replaced by the Northern India Salt Revenue Department. Retention of a portion of the line along the left bank of the Indus as far as the northern part of the Hazara district to prevent the entry of cheap Kohat salt into cis-Indus territory was, however, necessary. Duty on Kohat salt was low, Re. 0|3|0 up to 1883 and Re. 0|8|0 from 1883 to 1896. In 1897 it was raised to Rs. 2 and the last remnant of the Customs line was then abolished. The duty on Kohat and Punjab salt was equalised in 1905.

When the duty in Bombay and Madras was raised to Rs. 1|13|0 in 1869, it was reduced in Northern India from Rs. 3 to Rs. 2|12|0 and then to Rs. 2|8|0. In Bengal it was reduced from Rs. 3|4|0 to Rs. 3|2|0 and then to Rs. 2|14|0. A uniform rate of Rs. 2|8|0 was fixed thereafter throughout India. This was reduced to Rs. 2 in 1882 by Lord Ripon.

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It remained so till 1886 when it was again enhanced to Rs. 2|8|0. In Burma, however, the enhancement was from 0|3|0 to Re. 1. From 1888 to 1903 the rates remained as above. In 1903 the duty was reduced to Rs. 2, in 1905 to Rs. 1|8|0 and in 1907 to Re. 1. There was abnormal rise in price of salt during the War and various measures were adopted to keep it down. Duty, however, was raised to Rs. 1|4|0 in 1917 to help in meeting the financial situation created by the War. It was raised to Rs. 2|8|0 in 1923, but again reduced to Rs. 1|4|0 in 1924.

From 1925 to 1931 the Assembly made attempts to reduce the duty to Re. 1, 0|12|0 or 0|8|0 but without success. Excise duties were enhanced by 25 per cent. under the Indian Finance (Supplementary and Extending) Act, 1931, and the duty was raised to Rs. 1|9|0 which is the current rate. Under the salt (Additional Import Duty) Act of 1931, an Act which came into force from 18th March 1931, an additional duty of 0|4|6 was levied on all imported salt, in order to give protection to the indigenous industry. The additional duty was reduced to 0|2|6 from the beginning of 1933-34. The life of the Salt (Additional Import Duty) Act, 1931, as amended was extended to 30th April 1936. In April 1936 a Bill extending by two years the operation of the Salt (Additional Import Duty) Act of 1931 subject to a reduction of the rate of additional import duty to one and a half annas was passed by the Legislative Assembly. Thus the duty on foreign salt now-a-days is Rs. 1|10|6 per maund. This question will again be considered by Government in April 1938.

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CHAPTER XX.

Salt Industry in Bengal, Bihar and Orissa and its future prospects.

(*a*) HISTORICAL.

(i) *Bengal.*

In pre-British days local manufacture of salt went on along the coast, licence fees being levied on manufacture and duties imposed on transport. The locality of manufacture at the time of the Battle of Plassey (1757) was the Sunderbans. The salt was prepared by the local manufacturers called "Mullanghees"; Lord Clive and later Warran Hastings developed a system of monopoly of salt manufacture to raise revenue. Agencies worked at Hidgelli. Tumlook, 24 Parganas, Balwa and Chittagong Special areas were reserved for the supply of necessary fuel. All salt was purchased by the Company and sold by public auction. Details of the systems of collecting revenue in force have already been given in "History of Salt Revenue" chapter. Foreign salt first imported in 1818 gradually ousted the local product on account of its superior quality and cheapness—till (about 1863) the local industry was almost dead. Government therefore abandoned the monopoly in 1863, leaving manufacture free subject to Excise duty until 1897 when local manufacture was prohibited altogether, the cost of production being far higher than the selling price of imported salt owing to the weakness of the brine supply, the lack of fuel and other natural disadvantages. Since 1863 therefore the main source of supply for Bengal has been imported salt, the quantity of which increased considerably, namely, from about 28 lakhs of maunds per annum in 1850 to about 140 lakhs at the present time. In 1840-41, 40,73,000 maunds of local salt and 5,74,000 maunds of foreign salt were sold. Production and sale of local salt gradually fell off and imports increased. Now-a-days the imports of sea-borne salt average about 140 lakhs maunds. During the war it was considered desirable to revive local manufacture and it was accordingly made permissible in the Government of India's Notification No. 3227, dated the 18th May 1918, subject to the conditions of a licence to be granted by the Government of Bengal. After the publication of this notification a firm in Calcutta applied for and received permission to manufacture. The project was, however, soon abandoned as impracticable. Since the passing of the Salt (Additional Import Duty) Act, 1931, (Act XIV of 1931) levying temporary additional duty of customs on the import of foreign salt, attempts are being made to revive the salt industry in this province. This matter will be dealt with in detail presently.

(ii) *Bihar and Orissa.*

The salt manufactured in olden days was of two kinds (*i*) Panga and (*ii*) Karkatch.

Panga.—Salt was largely manufactured on parts of the sea board in Bengal including the present province of Orissa. It was of two kinds, 'Panga' and 'Karkatch'. 'Panga' salt was educed by boiling brine obtained by artificial heat and so fuel was necessary. Clear brine was

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boiled in small pots and impurities were removed as they rose to the surface. There was much wastage of fuel and the cost of production was fairly high. Panga salt was manufactured mostly in Balasore and Cuttack districts. The East India Company purchased salt from the 'Mullanghees' at Re. 0-8-0, Re. 0-12-0, Rs. 0-14-0 a maund according to agreements. In 1835-36 salt was manufactured by private individuals, but it had to be sold to Government. Manufacture for sale to the public was permitted in 1847 under a system of licence. In Orissa a large quantity of salt was produced. The competition of Madras and foreign salt, however, ultimately proved fatal to the local industry. With increasing competition the manufacture of this salt under an excise system became unprofitable. Moreover, forests were gradually exhausted and fuel was not easily obtainable. The Zamindars were very exacting as regards charges of rent for removal of salt earth from their estates and for the extracting of fuel from their forests. So the manufacture by Panga method no longer proved remunerative and was abandoned in 1889.

Karkatch.—Karkatch salt was obtained by evaporation by solar heat of brine obtained from the sea or from back waters or lagoons communicating with the sea. This method prevailed in the neighbourhood of Chilka lake at the extreme south of Orissa. The East India Company's monopoly was gradually abolished and replaced by excise system by 1863. The excise system which produced about 70,000 maunds was abolished in 1891 and the monopoly system revived, since under the strict control exercised by the Madras Salt Department manufacture of Karkatch salt under excise system ceased to be profitable. There were two Government factories, one at Tua in Puri and the other at Sartha in Balasore and subsequently a third at Gurubai in the Puri district. The latter was designed to enlist the co-operation of the Parikud Raja and to improve the condition of his ryots. Even manufacture by this cheaper method was, however, handicapped (1) by the weakness of brine and (2) by the thunderstorms to which this part of the coast is subject. When the opening of the East Coast Railway intensified the competition of Madras and Liverpool salt, the Orissa salt was unable to hold its own. By 1893-94 the production had dropped to 19,000 maunds. The Sartha Factory was closed in 1893 and the Tua and Gurubai factories in 1897-98. In 1901, and again 1908, the question of reviving the manufacture of salt in Orissa in the interests of the classes to whom it had previously afforded employment, was carefully considered by the Board of Revenue and Government and found to be impracticable. During the war, the question acquired a new importance. The high prices that then prevailed naturally rendered the prospects of reviving the industry much more favourable and the commercial aspects of such a revival were investigated by two or three firms. In particular, Mr. F. W. Gooch, formerly of the Madras Salt Department, studied the question at the instance of Messrs. Kilburn and Cmopany and Tata and Sons. His conclusions were that the revival of the manufacture by the Panga process (artificial heat) was quite impracticable but he thought that the revival of manufacture by the Karkatch method (solar evaporation) on the Chilka Lake promised success. With the termination of the war, however, the firms interested seem to have been satisfied that the conditions that alone could render the project a financial success no longer existed and they took no further steps in the matter. It was, however, further investigated by the Director of Industries, Bihar and Orissa, who

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came to the conclusion that unless the quality of brine in the Chilka Lake could be improved, a point which will be dealt with more fully below, "to attempt to make salt there would be madness". Any revival of the Panga method of manufacture he rejected, like all those who have studied the question, as quite impracticable. At the end of 1921, however. certain persons in the Balasore district asked to be allowed to start manufacture by the Panga system. This was investigated by the Director of Industries who pointed out that owing to the fall in the price of salt and difficulty of obtaining fuel it was practically certain that honest manufacture by this method could not prove profitable. While the matter was under the consideration of Government, the price of salt fell still further so that even on the figures prepared by the promoters of the scheme the manufacture was bound to result in a loss. They calculated the total cost of manufacture (including duty at Rs. 1-4-0) at Rs. 2-9-1½ per maund. They hoped to sell at Rs. 3-2-0 per maund wholesale and thus to make a profit of over 8 annas a maund. The wholesale price of salt in Orissa during the month of December 1924, was, however, Rs. 2-7-10 per maund. There is no reason to suppose that the cost of manufacture has fallen. Obviously, therefore, even on the figures furnished by the promoters, which are more likely to have been optimistic than the reverse, there is no margin of profit. In short, the manufacture of Karkatch salt in Orissa was only profitable so long as it was protected against Madras Salt and Imported salt by bad communications, and in part by the prejudice against imported salt which has largely died out. It was the opening of the Railway that really dealt a deathblow to it. Natural circumstances are also unfavourable. The climate is humid, and the early thunderstorms already mentioned shorten the working period. There appears to be no reason to doubt that just above the Chilka Lake there is for some reason a line on either side of which the climatic conditions are materially dissimilar. As stated by Mr. (subsequently Sir Krishna) Gupta, who had considerable local knowledge, and reported on the subject in the capacity of Commissioner of Orissa to the Commissioner of Salt and Excise, Bengal in 1901, the early "nor wester" in March and April was apparently one of the reasons why the Panga system of manufacture (which is not like the Karkatch system dependent on the weather) prevailed North of the Chilka Lake. He ascribed to the same cause the failure of the Government factory at Sartha in Balasore which had to be closed in 1893. He said this "only confirmed the previous experience that no Karkatch, was ever known to have been made beyond the northern confines of the Chilka". The Madras Salt Commission of 1876 also pointed out that statistics showed that in the previous ten years there had always been rain in June in Puri,—over 10 inches in four of those years, and in one no less than 23.71 inches. They said "the season is thus at the best of times not longer than 3 months and always precarious". Mr. Le Mesurier, speaking in the Bihar and Orissa Legislative Council said "in the Chilka, the thunderstorms of April and May repeatedly retard and destroy manufacture. In consequence, the most shallow form of irrigation was resorted to in the Chilka in order that the salt might be gathered in the interval between thunderstorms. The brine which was admitted into the crystallizing beds was ony the amount which was sufficient to cover the ground and there was hardly sufficient liquid left to carry away the magnesium salts", and this again adversely affected the quality of the salt. The Director of Industries, Bihar and Orissa, in his Report for 1920-21 said "the northern limit of this (Karkatch) process of manufacture is the Chilka lake itself since the rest of the coast of Orissa is subject to cyclonic storms at all times of the year ". It should be remembered in addition that the manufacture of the ordinary bay salt—salt educed from sea-water by solar evaporation—is impracticable at the head of the Bay of Bengal, because the salinity of the sea-water there is much lower than on the Madras coast where this is the ordinary method of manufacture, owing to the enormous discharge of fresh water from the rivers of the Gangetic and other systems. The sea-water apart from its low salinity is also unsuited for the manufacture of salt owing to the large amount of impurity in the form of silt that it contains.

(*b*) Sources.

Bengal depends entirely on extraneous sources for her supplies. Salt was until recently imported from England, Germany, Spain, Roumania, Africa and Aden. During recent years supplies from Aden and Indian sources have much increased. The Bengalee no longer shows an exclusive taste for the Panga or boiled variety. The coarsely crushed and crude salts which are cheaper have been mainly responsible for a change in his taste, prices being the determining factor. The 'Panga' salt is no longer imported. Salt is at present imported practically only from Germany (Hamburg), Aden and India (Bombay, Karachi, Okha, Porebunder, Navalaki and Tuticorin). Other places which formerly supplied large quantities, namely England, Spain, Port Said and the Red Sea ports—Mossowah and Assab, now send none at all or very little. This result is to be attributed to the operation of the protective import duty.

(*c*) Seasons.

Salt is imported all the year round. Liners from Hamburg carry salt to make up their cargo. Part cargoes from Indian ports are carried by the British India Steam Navigation Company's coastal vessels, while tramp steamers call in at Aden and the Western India Ports and transport large consignments of salt to Calcutta, re-loading, when empty, with coal or a cargo of jute in the season. While some of the Indian ports such as Karachi are affected by monsoonish conditions, Aden owing to her lack of rainfall, ships salt cargoes to Bengal practically throughout the year to find invariably a ready market.

(*d*) Kinds of salt imported.

The following are short descriptions of various kinds of salt imported at present.

1. *German Salt.*—This is a rock salt obtained from mines. It is imported after having been crushed at the mines. Its chief characteristic is its excessive dryness, and it has properties in retaining moisture, which renders it less liable to wastage due to climatic influences.

2. *Aden Salt.*—This is manufactured from sea water by solar evaporation and is imported both in Kurkutch and Fine forms. Aden now sends more than half the salt imported into Bengal.

3. *Indian Salts.*—(*a*) *Bombay.*—Manufactured by solar evaporation. Imported in Kurkutch or crystal forms. This salt originally had a very muddy appearance. There has been an improvement in the appearance in

recent years. Importations are not regular owing to the demand for it falling off, the consumer now-a-days apparently preferring a cleaner looking salt obtainable at a similar price.

(*b*) *Madras.*—The term Madras salt includes salt imported from Tuticorin which generally arrives in Kurkutch or crystal form. Consignments are irregular and small, more often being part cargoes of coastal vessels. Obtained by solar evaporation it is said to be gritty due probably to the sandy soil in which it is manufactured. In appearance it is cleaner looking than the Bombay variety.

(*c*) *Karachi.*—Manufactured by solar evaporation. It is imported in numerous grades and varieties. Large and regular consignments arrive and find a ready market.

(*d*) *Okha.*—This salt is also manufactured by solar evaporation, and is imported in crushed form. Importations are large and regular and find a ready market.

(*e*) *Nadir.*—From Porebunder. Manufactured by solar evaporation. Imported in Fine and Kurkutch form. Sales are not quite up to the standard of the Okha and Karachi varieties.

(*f*) *Navalakhi.—From Morvi*—Manufactured by solar evaporation. Imported in Crushed and Kurkutch form. Consignments are irregular, the salt apparently not having found a ready market.

Descriptions (*e*) and (*f*) have been introduced into the Bengal market in recent years. Importations from these two sources are not so regular as those of the Okha and Karachi varieties which appear to have established a market owng to a gradual process of improvement in quality.

(*e*) IMPORT FIGURES.

The imports in recent years have been as follows :—

	Lakhs of maunds.		Lakhs of maunds.
1911-12	134·86	1923-24	103·16
1912-13	137·03	1924-25	151·73
1913-14	146·70	1925-26	136·92
1914-15	108·29	1926-27	132·20
1915-16	134·24	1927-28	145·24
1916-17	95·27	1928-29	150·37
1917-18	83·79	1929-30	162·46
1918-19	100·96	1930-31	173·92
1919-20	108·38	1931-32	135·09
1920-21	156·06	1932-33	156·25
1921-22	116·50	1933-34	123·28
1922-23	132·59	1934-35	140·05

The small imports between 1916-17 and 1919-20 were due to the war and the lack of shipping. In 1923-24 imports were checked by the higher duty then prevailing, the merchants being confident that the higher duty was only temporary. The 1926-27 figures were below normal owing to the

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coal strike in England. The sudden fall in imports from 173.92 lakhs of maunds in 1930-31 to 123.28 lakhs of maunds in 1933-34 and 140.05 lakhs of maunds in 1934-35 may have been partly due to the economic blight of the last few years, and partly due to the concessions under the Delhi Pact in 1931. The sources of supply have undergone considerable changes and recently, owing to the protective policy adopted by the Government of India, foreign salts (except Hamburg salt) have practically disappeared and the present supplies are obtained almost entirely from Aden and Western India. In the year 1934-35, Aden contributed 52 per cent. of the salt imported into Bengal (in 1931-32 and again in 1933-34 Aden's figure had been 62 per cent. the highest it has ever reached) and Indian sources 40 per cent. The Indian supplies are increasing yearly.

(*f*) DISTRIBUTION OF IMPORTS.

Imports during the recent years have been distributed as follows :—

1929-30.

Country of origin.	Calcutta.	Chittagong.	Total of both ports.	Percentage.
Liverpool	20,76,888	30	20,76,918	12·78
Hamburg	7,65,960	..	7,65,960	4·72
Spain	12,93,235	3,27,256	16,20,491	9·98
Port Said	17,58,814	3,49,558	21,08,372	12·98
Massowah	13,44,570	..	13,44,570	8·28
Aden	51,32,257	7,63,704	58,95,961	36·29
Bombay	7,68,546	..	7,68,546	4·75
Karachi..	4,71,797	..	4,71,797	2·90
Okha	1,84,051	..	1,84,051	1·13
Djibouti	5,27,939	..	5,27,939	3·25
Roumania	2,18,527	..	2,18,527	1·35
Assab	1,78,565	..	1,78,565	1·09
Tuticorin	85,040	..	85,040	0·52
Ras Hafun	..	..	..	..
Total ..	1,48,06,189	14,40,548	1,62,46,737	100·00

1930-31.

Country of origin.	Calcutta.	Chittagong.	Total of both ports.	Percentage.
Liverpool	9,98,000	34	9,98,034	5·74
Hamburg	14,41,711	..	14,41,711	8·29
Spain	14,54,929	3,30,525	17,85,454	10·27
Port Said	22,65,517	6,39,683	29,05,200	16·70
Massowah	12,13,753	1,77,333	13,91,086	8·000
Aden	44,91,520	3,63,954	48,55,474	27·92
Bombay	5,79,845	..	5,79,845	3·34
Karachi..	44,1,381	..	4,41,381	2·53
Okha	1,65,933	..	1,65,933	0·95
Djibouti	3,65,768	..	3,65,768	2·10
Roumania	..	..	..	..
Assab	14,01,164	..	14,01,164	8·05
Tuticorin	..	..	..	..
Ras Hafun	8,38,512	1,45,925	9,84,416	5·67
Java	76,592	..	76,592	0·44
	1,57,34,634	16,57,454	1,73,92,088	100·00

1931-32

Country of origin.	Calcutta.	Chittagong.	Total of both ports.	Percentage.
Liverpool	5,38,636	19	5,38,655	3·98
Hamburg	3,10,010	..	3,10,010	2·23
Spain	..	..	..	..
Port Said	3,54,606	..	3,54,606	2·63
Massawah	..	..	..	..
Aden	75,90,261	7,32,520	83,22,781	61·62
Bombay	9,19,132	..	9,19,132	6·82
Karachi..	7,56,571	..	7,56,571	5·61
Okha	3,54,462	..	3,54, 462	2·63
Djibouti	..	..	..	..
Roumania	..	..	..	..
Assab	5,03,243	..	5,03,243	3·73
Tuticorin	4,53,099	..	4,53,099	3·36
Ras Hafun	8,01,214	..	8,01,214	5·95
Java	..	..	..	..
Navalakhi	1,95,345	..	1,95,345	1·44
Total ..	1,27,76,579	7,32,539	1,35,09,118	100·00

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Country of origin.	Calcutta.	Chittagong.	Total of both ports.	Percentage.
	1932-33.			
Liverpool	6,44,546	522	6,45,068	4·13
Hamburg	7,55,317	1,379	7,56,696	4·85
Spain	4,17,610	1,46,555	5,64,165	3·62
Port Said	3,99,596	1,63,655	5,63,251	3·61
Aden	70,46,404	8,64,923	17,11,327	50·63
Bombay	3,56,232	..	3,56,232	2·27
Karachi..	9,44,860	..	9,44,860	6·04
Okha	9,19,296	..	9,19,296	5·89
Djibouti	1,41,300	..	1,41,300	0·90
Assab	10,23,340	..	10,23,340	6·55
Tuticorin	4,02,128	..	4,02,128	2·58
Ras Hafun	9,60,627	1,46,774	11,07,401	7·08
Navalakhi	1,92,520	..	1,92,520	8·23
Nadir (Porbander) ..	97,460	..	97,460	0·62
Total ..	1,43,01,236	13,23,808	1,56,25,044	100·00
	1933-34.			
Liverpool	..	19	19	0·00
Hamburg	10,50,263	..	10 50,263	8·60
Spain	..	..	..	0·00
Port Said	..	74,211	74,211	0·60
Aden	68,19,742	8,63,915	76,83,656	62·31
Bombay	4,28,529	..	4,28,529	3·47
Karachi..	8,50,194	..	8,50,194	6·89
Okha	10,38,586	..	10,38,586	8·42
Djibouti	..	..	..	0·00
Assab	..	..	..	0·00
Tuticorin	2,97,799	..	2,97,799	2·40
Ras Hafun	2,00,620	..	2,00,620	1·62
Navalakhi	3,58,150	..	3,58,150	2·89
Nadir (Porbander) ..	3,46,320	..	3,46,320	2·80
Madagascar	272	..	272	0·00
Total ..	1,13,90,595	9,38,145	1,23,28,620	100·00

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1934-35.

Country of origin.	Calcutta.	Chittagong.	Total of both ports.	Percentage.
Liverpool	..	16	16	0·00
Hamburg	9,35,360	..	9,35,360	6·68
Ras Hafun	1,12,022	..	1,12,022	0·80
Port Said	..	53,842	53,842	0·38
Madagascar	..	..	..	0·00
Aden	63,44,436	9,07,221	72,51,657	51·78
Bombay	4,32,023	..	4,32,023	3·08
Karachi	21,13,058	..	21,13,058	15·09
Okha	15,78,300	..	15,78,300	11·27
Tuticorin	4,70,932	..	4,70,932	2·99
Navalakhi	4,92,081	..	4,92,081	3·51
Nadir (Porbandar) ..	6,19,570	..	6,19,570	4·42
Total ..	1,30,44,782	9,61,079	1,40,05,861	100·00

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(*g*) ANALYSIS OF IMPORTED SALTS.

The following statement shows the analysis of various kinds of salt imported into Calcutta. The statement includes even those salts the imports of which have stopped during recent years :—

Analysis of various kinds of salt imported into Calcutta—contd.

Description of Samples.	Insoluble.		Percentage calculated on mositure-free samples.							Total.	Moisture in the samples.
	Organic.	Inorg.	Sodium chloride.	Magnesium chloride.	Magnesium sulphate.	Calcium sulphate.	Calcium chloride.	Sodium sulphate.	Undetermined (by diff.).		
	%	%	%	%	%	%	%	%	%		
1. Fine White Cheshire	..	Trace	97·76	..	..	1·31	0·90	..	0·03	100·0	0·23
2. Hamburg Fine	..	0·42	98·19	..	..	0·51	0·39	..	0·49	100·0	0·19
3. Spanish Fine	..	0·13	97·81	..	..	0·88	1·12	..	0·06	100·0	0·62
4. Spanish Karkutch	..	0·30	96·57	1·20	0·16	1·46	..	..	0·31	100·0	3·17
5. Port Said Crushed	..	0·16	98·58	..	..	0·71	0·35	..	0·20	100·0	2·06
6. Bombay Karkutch	Traces	0·03	98·08	0·78	0·08	0·51	..	..	0·52	100·0	7·36
7. Aden Fine	..	0·01	98·19	..	..	1·41	0·06	..	0·33	100·0	3·81
8. Aden Karkutch	..	0·01	98·35	..	..	1·05	0·54	..	0·05	100·0	1·61
9. Fine White Massowah Crushed	..	0·02	97·60	..	..	1·63	0·51	..	0·24	100·0	4·0
10. Liverpool Lump Rock	..	4·94	93·28	..	..	0·89	0·85	..	0·04	100·0	0·62
11. Djibouti Crushed	..	0·01	97·82	..	..	1·40	..	0·69	0·08	100·0	3·45
12. Indo Aden Fine	..	0·18	98·11	..	..	1·31	0·29	..	0·11	100·0	3·22

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13. Indo Aden Karkutch	..	0·12	98·30	..	..	1·37	0·17	..	0·04	100·0	3·35
14. Hamburg Vaca	..	0·16	98·25	..	..	1·33	..	0·22	0·04	100·0	0·57
15. Fine White Spanish Crushed ..	..	0·24	99·03	..	..	0·27	0·37	..	0·09	100·0	0·90
16. Karachi Fine	..	0·08	97·67	..	..	1·62	0·58	..	0·05	100·0	2·95
17. Karachi	..	0·21	97·64	..	..	1·	0·63	..	0·25	100·0	2·27
18. Aden Solar Fine	..	0·16	97·15	..	..	1·92	0·71	..	0·06	100·0	4·48
19. Tunis Fine	..	1·0	97·62	..	..	0·86	0·39	..	0·13	100·0	0·91
20. Tunis Crushed	..	0·77	97·81	..	..	0·90	0·38	..	0·14	100·0	0·74
21. Tunis Table	..	0·52	98·32	..	..	0·62	0·13	..	0·41	100·0	0·36
22. Tunis White Karkutch	..	0·31	97·94	..	..	1·24	0·54	..	0·03	100·0	2·96
23. Roumania Fine	..	0·62	98·95	..	..	0·18	..	..	0·25	100·0	0·37
24. La Princesse Salt	..	1·01	97·45	..	..	0·96	0·10	..	0·48	100·0	1·45
25. Little Aden Karkutch	..	0·33	97·97	..	..	0·94	0·57	..	0·19	100·0	3·04
26. Hamburg Rock	..	..	99·92	..	..	Trace	..	..	0·08	100·0	..
27. Okha Salt	..	0·41	96·93	..	..	1·63	0·78	..	0·25	100·0	3·13
28. Aden Karkutch Salt	..	0·52	98·17	..	..	0·94	0·99	..	0·28	100·0	1·2
29. Tuticorin Salt	..	0·49	95·70	..	..	2·08	..	1·52	0·21	100·0	7·76
30. Hamburg Brine Salt	..	Trace	97·70	..	..	1·22	0·85	..	0·23	100·0	0·48
31. Okha Salt (Uncrushed)	..	0·06	98·33	..	..	1·12	0·39	0·39	0·10	100·0	3·13
32. Karachi Grax Super Kurkutch ..	0·04	0·29	97·43	0·48	..	0·95	0·16	.. Potassium	0·65 present.	100·0	4·05
33. Karkach Hamburg	..	0·20	98·51	0·19	..	0·83	0·05	.. Potassium	0·22 present.	100·0	0·63
34. Massowah Kurkutch	0·02	0·09	96·42	1·27	0·62	1·54	..	.. Potassium	0·44 present.	100·0	8·71
35. Special Ras Hafun Salt Karkutch ..	0·05	0·21	98·67	0·33	*Nil.*	0·76	0·02	*Nil.* Potassium	*Nil.* present.	100·0	2·9

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Analysis of various kinds of salt imported into Calcutta—contd.

Description of Samples.	Insoluble.		Percentage calculated on mositure-free samples.							Total.	Moisture in the samples.
	Organic.	Inorg.	Sodium chloride.	Magnesium chloride.	Magnesium sulphate.	Calcium sulphate.	Calcium chloride.	Sodium sulphate.	Undetermined (by diff.).		
	%	%	%	%	%	%	%	%	%		
36. Special Ras Hafun Salt Crushed ..	0·04	0·01	98·25	0·44	0·05	0·73	*Nil.*	*Nil.* Potassium	0·28 present.	100·0	6·74
37. Java Kurkutch	0·04	0·25	96·78	1·11	0·22	0·89	..	*Nil.* Potassium	0·71 present.	100·0	8·70
38. Karachi Moon Kurkutch	0·06	0·60	93·88	1·66	..	3·15	Traces.	*Nil.* Potassium	0·65 present.	100·0	9·44
39. Aden Solar Kurkutch	0·08	0·48	97·51	0·23	0·07	1·23	..	*Nil.* Potassium	0·40 present.	100·0	9·40
40. Fine white Spanish salt	0·01	..	99·65	Traces	..	0·28	..	*Nil.* Potassium	0·06 present.	100·0	5·94
41. Karachi Grax Coarse Kurkutch ..	0·17	0·62	96·45	0·58	..	1·39	0·40	*Nil.* Potassium	0·39 present.	100·0	3·41
42. Ras Hafun Dudean Kurkutch ..	0·02	0·11	98·85	0·18	..	0·79	0·02	*Nil.* Potassium	0·03 present.	100·0	2·21
43. Ras Hafun Fine	0·02	0·11	98·54	0·32	..	0·81	0·16	*Nil.* Potassium	0·04 present.	100·0	2·79
44. Asab Coarse Salt	0·02	0·07	96·87	1·32	0·75	0·83	..	*Nil.* Potassium	0·14 present.	100·0	3·79
45. Karachi Grax Kurkutch	0·04	0·39	96·81	0·42	..	1·66	0·48	*Nil.* Potassium	0·20 present.	100·0	1·78
46. Okha Kurkutch	0·05	0·48	97·39	0·63	0·11	1·22	..	*Nil.*	0·12	100·0	3·33

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7. Okha Crushed	0·02	0·34	98·01	0·46	0·15	0·96	..	*Nil.* Potassium	0·06 present.	100·0	2·94
48. Ras Hafun Bright	Traces	0·08	98·80	0·33	..	0·76	0·03	*Nil.* Potassium	.. present.	100·0	1·09
49. Navalakhi Salt	0·01	0·17	96·33	1·32	0·61	0·72	..	*Nil.* Potassium	0·34 present.	100·0	6·89
50. Karachi Luxmi Vaca Salt No. 2	0·10	0·62	97·05	0·72	0·20	0·95	..	*Nil.* Potassium	0·36 present.	100·0	5·11
51. Karachi Grax fine	0·03	0·52	96·49	0·64	..	1·49	..	*Nil.* Potassium	0·83 present.	100·0	4·97
52. Tuticorin Kurkutch	0·06	0·55	93·63	2·47	1·73	1·06	..	*Nil.* Potassium	0·50 present.	100·0	5·85
53. Tuticorin Coarse A.	0·13	0·67	92·98	2·37	1·83	1·53	..	..	0·49	100·0	5·82
54. Tuticorin Coarse B.	0·12	1·00	93·10	2·66	1·50	1·20	..	..	0·60	100·0	5·25
55. Karachi Nas. Kurkutch	0·51	0·06	95·56	1·07	0·17	2·10	..	..	0·49	100·0	3·78
56. Karachi Laxmi Fine	0·64	0·03	96·70	0·51	0·40	1·12	..	..	0·57	100·0	2·46
57. Navalakhi Kurkutch	0·20	0·0	97·50	0·68	0·51	0·76	..	..	0·32	100·0	4·49
58. Karachi Grax Fine Crushed	0·31	·06	97·66	0·50	0·09	0·95	..	..	0·46	100·0	1·93
59. Tuticorin Super Kurkutch	0·30	0·10	93·83	2·92	1·38	1·14	..	..	0·37	100·0	9·66
60. Tuticorin Crustle Kurkutch	0·67	Trace	93·75	2·42	1·58	1·28	..	..	0·20	100·0	5·69
61. Coarse grained Madagascar	0·12	0·08	98·62	0·27	..	0·51	0·09	..	0·39	100·0	..
62. Navalakhi Black Kurkutch	0·01	0·05	96·77	0·79	0·11	0·97	..	..	0·27	100·0	1·77
63. Karachi Uncrushed	0·34	0·01	96·04	0·87	..	2·00	0·22	..	0·48	100·0	1·41
64. Navalakhi Uncrushed	0·17	0·05	96·66	1·40	0·44	..	0·82	..	0·50	100·0	4·43
65. Navalakhi Crushed	0·16	0·06	97·10	0·95	0·53	0·75	..	..	0·46	100·0	3·29
66. Karachi Khursheed Crushed	0·35	Trace	96·95	0·60	0·07	1·46	..	..	0·51	100·0	1·83
67. Karachi Khursheed Kurkutch	0·27	0·01	98·37	0·36	0·19	0·42	..	..	0·39	100·0	3·81

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Analysis of various kinds of salt imported into Calcutta—contd.

Description of Samples.	Insoluble.		Percentage calculated on mositure-free samples.							Total.	Moisture in the samples.
	Organic.	Inorg.	Sodium chloride.	Magnesium chloride.	Magnesium sulphate.	Calcium sulphate.	Calcium chloride.	Sodium sulphate.	Undetermined (by diff.).		
	%	%	%	%	%	%	%	%	%		
68. Karachi Nas Uncrushed	0·48	0·10	97·58	0·38	0·57	0·76	..	..	0·24	100·0	5·10
69. Karachi Khursheed	0·35	0·13	97·12	0·62	..	1·38	Trace	..	0·43	100·0	4·19
70. Karachi Nas Crushed	0·67	0·10	95·86	0·38	0·10	2·49	..	..	0·37	100·0	5·06
71. Karachi Khursheed Fine	0·33	0·12	98·00	0·38	0·03	0·87	..	..	0·27	100·0	2·63
72. Karachi Nas Fine	0·55	0·12	95·79	0·55	..	2·63	..	..	0·46	100·0	3·74
73. Tuticorin White Kurkutch ..	0·74	0·10	95·06	0·83	..	3·05	Trace	..	0·20	100·0	5·09
74. Karachi Gulbai Kurkutch	0·10	0·40	96·52	0·40	..	1·92	0·35	..	0·31	100·0	1·86

(*h*) SYSTEM OF SALES.

The great bulk of the salt consumed in Bengal being sea-imported passes into consumption by payment of duty direct from ship board or from the bonded warehouses at Sulkea (Howrah) and Chittagong and 8 private bonded warehouses in Bengal—1 at Narayangange, 3 at Bhairab, 2 at Kamlaghat and 2 at Chandpur.

(*i*) INLAND BONDED WAREHOUSES.

The bonding system is one of the various facilities offered by Government for the distribution of salt with the object of reducing its price to the consumer. Private bonded houses were first established as long ago as 1836 at declared warehousing ports. In 1863 the Collector of Customs was authorized to license private bonding warehouses at places other than ports. Public warehouses for salt under Government control have been established under Section 15 of the Sea Customs Act of 1878 at the ports of Calcutta and Chittagong. The private bonded warehouses are established under Section 4 of the Inland Bonded Warehouses Act 1896 at places other than warehousing ports. At present there are eight private bonded warehouses in the Presidency, two at Chandpur in Tippera, one at Naraingang and two at Kamalaghat in Dacca, and three at Bhairab in Mymensingh. Four out of these eight were opened in 1934-35 only. At each a Daroga and peons are stationed on behalf of Government but at the cost of the bonder, to supervise the receipt and issue of salt. About three lakhs of maunds of salt are annually sent to these warehouses from shipboard and Sulkea. During 1933-34 and 1934-35, 3,00,860 and 3,62,800 maunds of salt respectively were despatched to these warehouses. The advantage to traders is obvious. By the postponement of the payment of duty till the salt is actually issued, a trader is able to conduct his business with much less capital than if he had to prepay the duty. The inland bonded warehouses are inspected by the district officers and officers of the Excise and Salt Department.

(*j*) SELLING PRICES.

The price of imported salt to traders is usually quoted per hundred maunds without duty and Port Commissioners' toll which is now (1936) Rs. 5|7|0 for hundred maunds. Prices used to vary greatly from day to day, but since the passing of the Salt (Additional Import Duty) Act the price of each kind of salt has become steady for long periods at a time and changes practically only with changes in rates of freight. Prices in recent years are shown in the following statement which has been arranged to show the chronological course of prices from 1930-31 onwards.

The prices are per 100 maunds :—

1930-31.

——	1st quarter.		2nd quarter.		3rd quarter.		4th quarter.	
	Calcutta.	Chittagong.	Calcutta.	Chitta gong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.
Liverpool ..	73	..	73	..	68	..	61	..
Spain ..	63	79	62	75	49	75	45	51
Port Said ..	61	75	56	75	52	69	42	51
Aden ..	60	75	56	75	45	75	42	52
Massowah ..	54	79	53	75	51	75	43	50
Hamburg ..	72	..	71	..	66	..	60	..
Djibouti ..	60	..	56	..	45	..	40	..
Bombay ..	57	..	57	..	57	..	52	..
Roumania ..	..	..	..	..	..	..	..	..
Karachi ..	62	..	62	..	53	..	50	..
Torravija ..	..	..	..	..	..	..	..	..
Tunis ..	..	..	..	..	..	..	..	..
Tuticorin ..	54	..	..	..	..	..	..	..
Okha ..	57	..	57	..	..	..	..	..
Assab ..	60	..	60	..	58	..	46	..
Ras Hafun ..	..	..	..	..	..	..	46	50
Java ..	..	..	55	..	..	..	..	..
Navalakhi ..	..	..	..	..	..	..	..	..
Nadir ..	..	..	..	..	..	..	..	..

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—	1931-32.								1932-33.							
	1st quarter.		2nd quarter.		3rd quarter.		4th quarter.		1st quarter.		2nd quarter.		3rd quarter.		4th quarter.	
	Calcutta.	Chittagong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.	Calcutta.	Chittagong.
Liverpool	59	..	65	..	63	..	65	..	67	..	65	..	58	..	58	..
Spain	48	56	53	56	55	56	55	58	51	46	43	65	..	65	31	69
Port Said	41	56	50	56	49	56	49	56	48	56	41	54	35	56	29	56
Aden	56	56	63	58	65	69	68	75	70	75	64	75	57	75	57	69
Massowah	43	56	43	..	45	..	49	..	46	..	40	..	33	..	30	..
Hamburg	51	..	62	..	63	..	64	..	51	..	..	..	50	..	..	..
Djibouti	37	..	37	..	50	..	50	..	44	..	40	..	35	..	..	..
Bombay	55	..	53	..	50	..	54	..	41	..	38	..	35	..	39	..
Roumania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Karachi	61	..	57	..	55	..	61	..	44	..	54	..	55	..	43	..
Torravija	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tunis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tuticorin	..	..	..	..	50	..	53	..	48	..	44	..	41	..	48	..

Massowah	..	..	..	33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hamburg	..	..	..	53	..	54	..	49	..	49	..	49	..	47	..	45	..	..	..
Djibouti	..	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..
Bombay	..	..	..	39	..	55	..	53	..	54	..	51	..	55	..	48	..	43	..
Roumania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Karachi	..	..	..	..	..	42	..	43	..	42	..	..	..	46	..	50	..	47	..
Torravija	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tunis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tuticorin	..	..	..	42	..	44	..	41	..	..	..	45	..	42	..	44	..	45	..
Okha	..	..	..	44	..	41	..	43	..	47	..	..	..	47	..	50	..	50	..
Assab	..	..	..	..	..	..	..	28	..	31	..	..	..	..	..	..	..	..	..
Ras Hafun	..	..	..	44	50	46	..	43	50	43	50	41	..	37	..	39	..	..	..
Java	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Navalakhi	..	..	..	42	..	42	..	42	..	46	..	50	..	46	..	51	..	48	..
Nadir	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	49	..

Massowah	33	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hamburg	53	..	54	..	49	..	49	..	49	..	47	..	45	..	..	..
Djibouti	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..
Bombay	39	..	55	..	53	..	54	..	51	..	55	..	48	..	43	..
Roumania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Karachi	..	..	42	..	43	..	42	..	..	..	46	..	50	..	47	..
Torravija	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tunis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tuticorin	42	..	44	..	41	..	..	..	45	..	42	..	44	..	45	..
Okha	44	..	41	..	43	..	47	..	..	..	47	..	50	..	50	..
Assab	..	..	..	..	28	..	31	..	..	..	..	..	..	..	..	..
Ras Hafun	44	50	46	..	43	50	43	50	41	..	37	..	39	..	..	..
Java	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Navalakhi	42	..	42	..	42	..	46	..	50	..	46	..	51	..	48	..
Nadir	..	..	..	..	..	..	..	..	..	..	..	..	..	..	49	..

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During the early part of the year 1930-31, the wholesale prices per 100 maunds of all salts fell considerably as a result of competition. Consequent on the imposition of the additional duty on foreign salt, a further drop in price of salt imported from foreign ports occurred to enable it to compete with Indian salts.

In the year 1931-32, the prices of all salts fell, except in the last quarter of the year, when there was a slight rise owing to heavy demands.

During the first quarter of 1932-33, the prices were higher than during the corresponding period of the previous year, but there was a general fall in prices of all descriptions of salt thereafter.

Throughout the year 1933-34 there was a general fall in the prices of all descriptions of salts, except Bombay salt, which after falling slightly during the first quarter, obtained a very good price for the remainder of the year. There was a slight rise in the prices of Aden and Okha salts in the 3rd and 4th quarters of the year 1934-35.

(*k*) POSSIBILITIES OF MANUFACTURE.

Manufacture of ordinary bay salt.—Salt eduction from sea water by solar evaporation has never been practised on a commercial scale in Bengal and Bihar except by Karkatch method around Chilka lake. Successful manufacture of solar salt depends on favourable climatic conditions ; humidity, high temperature, absence of heavy rains, prevalence of winds, length of working season, etc. Bengal has a heavy rainfall and humidity is very high. The working season is short. Natural circumstances such as humid climate, thunderstorms, low density of brine owing to enormous discharge of fresh water by rivers in the Bay of Bengal, and the presence of impurities such as silt in the brine, etc., are all factors against solar manufacture of salt ; Bengal is consequently ruled out as a suitable salt source. The Indian Taxation Enquiry Committee, 1924, went into the question and were forced to the same conclusion. The views of the Central Board of Revenue on the point are summed up below :—

> "The possibility of manufacturing salt on a commercial scale has been examined by the Government on many occasions only to be rejected. It is rendered impracticable by the low density of the sea water due to enormous discharge of fresh water from the great rivers, the prevalence of damp, cloudy weather, the scarcity of fuel for one method of manufacture (Panga) which in any case could hardly yield an output of any magnitude, and the occurrence of storms at critical seasons."

This was also the opinion of a consulting Chemist of repute, Mr. Kapilram H. Vakil, who examined the possibilities of salt manufacture in Bengal on behalf of Tatas and submitted a report unfavourable to economic manufacture in the north of Lake Chilka.

Even if manufactured, salt would be of inferior quality and might not be acceptable to the Bengal market. It is, however, urged on the other side that the prejudices in favour of a better quality salt vanish when the question of price comes in. The share of the United Kingdom has fallen during the past 50 years from 85 per cent. of the total imports

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to almost nothing and the market has been captured partly by German salt and partly by cheaper solar salts from Aden and Red Sea. Another point urged is that salt has been manufactured here for centuries and even the East India Company manufactured it for about 90 years and so there is no reason why it should not prove a success now. But this argument ignores the changes in economic conditions and cannot stand. In pre-British days and the days of East India Company the manufacture was carried on under non-competitive conditions. The East India Company enforced its monopoly by keeping out Madras and other salts. As soon as transport facilities increased and other kinds of salt came into the market, the local manufacture could not stand.

The question of reviving the salt industry in Bengal, Bihar and Orissa has engaged the attention of both the local and the Central Governments from time to time. During War days, Mr. F. W. Gooch studied the question at the instance of Messrs. Kilburn and Company and Tata and Sons. He considered that in order to improve the quality of the brine in the Chilka lake it was necessary to tackle the problem of providing the lake with an adequate outlet to the sea and keeping it open. He also proposed an elaborate system of extensive and costly bunds enclosing, in the first instance, about ten square miles of the bed of the lake so as to exclude fresh water and form a saltern. Another area measuring about three miles by 1½ miles was also to be bunded to form a brine reservoir and extensive channels and cross channels were to be built. Mr. Gooch also considered that the railway should be extended from Puri to Panjapadu, but as an alternative contemplated the maintenance of a fleet of flats and tugs to convey the salt across the lake. It is thus clear that he considered that the manufacture of salt on the Chilka Lake was only possible if works on a very ambitious scale and involving large initial outlay were undertaken. Mr. Gooch, however, did not take into consideration the unsuitability of the soil in the locality nor did he indicate what was likely to be the cost of his scheme. His report contains nothing of the nature of a calculation of its financial prospects and this is probably why the firms interested took no action on it. The chances of making a commercial success of any such project are of course much smaller now than they were in 1918 owing to a heavy decline in the price of salt since then. The idea of opening a Government factory has been definitely abandoned as the past history of the industry and fall in prices since the War demonstrated that such a factory could not work at a profit. Since the report of the Indian Tariff Board, 1930, and the passing of the Salt (Additional Import Duty) Act, 1931, the question of reviving the salt industry in Bengal and Bihar and Orissa has once again acquired a new importance.

(l) RECENT INVESTIGATIONS INTO POSSIBILITIES OF SALT MANUFACTURE.

Under the Salt (Additional Import Duty) Act, 1931, an extra duty of Re. 0-4-6 a maund was levied on all imported salt from 18th March 1931. This was reduced to Re. 0-2-6 from 1933-34, and to one and a half annas from April 1936. One of the purposes for which the proceeds of this additional duty were earmarked was to investigate into possibilities of the development of extinct sources like Bengal, Bihar and Orissa and generally on the East Coast. The Government of India accordingly deputed

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Mr. C. H. Pitt, late General Manager, Salt Range Division, Khewra, in November 1931, who went into this question. The report is an exhaustive one and his views are outlined below :—

(i) *Manufacture by solar evaporation—Elsewhere than on Chilka Lake.*

Any attempt to manufacture salt on a commercial scale by solar evaporation only on the Bengal or North Orissa coast must end in complete failure owing to (*a*) weakness of brine, (*b*) short working season which is at the most five months, from December to April, (*c*) unfavourable climatic conditions such as high humidity, high rainfall, low wind velocity and low temperature. Although manufacture on a commercial scale is not possible, it cannot be said that manufacture on a small scale too is not possible. Investigation on an experimental scale is suggested.

(ii) *On Chilka Lake.*

The position of manufacture on Chilka Lake is more hopeful. Salt manufacture was going on up to 1897. Chilka lake is not far from Humma in Ganjam where salt is now manufactured. Brine supply is uncertain, since it depends on the channel between the lake and the sea being open. The lake was originally an open bay, but has been gradually silted up by deposits from Mahanadi river which falls into it. It is 44 miles long from north to south and varies in width from 20 miles in the north to 5 miles in the south. The lake water is of very low density and unfit for salt manufacture. If the lake had an outlet and were open to the sea, this would improve the quality of brine. It is impossible to keep the channel open by artificial means ; it must be left to the flood water to burst it. A factory in one of the islands in the lake would be able to obtain brine of satisfactory strength from February or March. Salt for local markets could be sent by rail. But the part of the lake where brine is strongest is too shallow for any but the smallest boats. Works will have to be undertaken on an ambitious scale and the manufacture of salt would be a speculative venture.

(iii) *Manufacture for Bengal.*

This would be in the nature of speculation with a heavy gambling element. Thorough examination must be made before any scheme is undertaken. The site suggested is to North-East of Arakakhud on an arm of lake running towards Narsing-Patnam.

The lake is close to the storm zone ; and so storms may destroy much of the crop and make work in the best months fruitless and cause heavy damage to works. The scheme suggested involves the use of pumps to take in water from the sea and the construction of bunds to direct fresh water streams. Wind power might be used to supplement and economise the use of oil engines. With pumps the manufacture could go on from the end of October to the end of May. It would be essential to exercise great care in the manufacture of salt. It cannot be said with certainty that salt suitable for Calcutta market can be produced. Some preliminary small scale experiments would be necessary to test the quality of salt which can be manufactured. A rough estimate of the capital cost of works designed to yield about 3 lakhs of maunds of salt annually is Rs. 5 lakhs.

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The cost may work to Rs. 53-10-0 per 100 maunds. Arakakhud or Narsing-Patnam site might produce 10 lakhs of Karkatch salt. Salt could be dispached by lorry to Puri and sold in Orissa. A factory might also be established at Gurubai—salt was manufactured here and a Government factory existed there, but was closed in 1896. Mr. Pitt prefers this to Tua Island where also a Government factory worked up to 1896. Brine supply is unreliable. A capital expenditure of Rs. 30,000 may be necessary for an annual output of 60,000 maunds. Transport of salt could be done by boat, cart or rail. The maximum area that might be brought under salt culture is about 800 acres and the annual yield can be up to 2 lakh maunds.

(*iv*) *Manufacture by Vacuum process.*

This system of manufacture consists of boiling of saturated brine under Vacuum. In Mr. Pitt's opinion there is practically no possibility of manufacture in Bengal or North Orissa on the Vacuum Evaporation System proving a commercial success. A high grade salt could be produced—but its cost at Calcutta would be Rs. 82 per 100 maunds or Rs. 23 per ton. No crushing would be required. The cost would be too high. The capital cost of the smallest plant will be Rs. 8 lakhs. The working season is about four months—this is the only period when brine of required strength is available—this system requires an uninterrupted supply of concentrated brine—in the absence of such a supply, cost of fuel is prohibitive. The process requires skilled supervision and operation. Experts from America or Europe will have to be called and overhead charges will be enormous.

(*v*) *Manufacture by Artificial Evaporation Open Pans.*

Manufacture of salt by old methods of lixiviation of salt earth and boiling the brine is out of the question. The people might try the method and Government could post preventive staff. If any subsidy were given, Government should audit the accounts of such factories.

Mr. Pitt suggests an improved method of combined solar and artificial evaporation using sea brine and not saline earth. It is not necessary to summarise the technical details of this process here. Capital expenditure of an experimental factory with an output of 25,000 maunds will be Rs. 25,000 at least and running cost at Rs. 20,000 per annum. The quality of salt will be nearly equal to imported salt.

The site proposed is Lothian Islands—the Coast Line near Chittagong about 20 miles south of Balasore. Government investigation is necessary—Government might have surveys made of suitable areas and also record readings of the rise and fall of tides throughout the manufacturing season, in order to find out what areas are liable to submersion by sea water.

(*vi*) *Cottage Industry.*

Manufacture of salt as a cottage industry on a small scale already exists, as a result of the recent relaxation of the salt laws. If developed, it will provide occupation for agricultural labour for some months, when low wages would be accepted. Experiments might be made at one or two places on the coast line. Merchants should be allowed to erect warehouses

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for the collection of salt made in this way. Government might make preventive arrangement, but not at a heavy cost. The salt would not find a market more than 20 miles from the depot. Mr. Pitt is not optimistic about this scheme. The following possible sites for experiments have been suggested :—

Purshottampur on the Contai foreshore, Baichibania, Tajpur and Mandarmani round the mouth of Bheri-khan khal or the mouth of Burhabalong river near Balasore. Future manufacturers will suggest other sites. The experiment should be conducted for a couple of years.

The effect of manufacture in Orissa will be to replace Madras salt* which may find an outlet in the Central Provinces where Bombay salt is consumed. It will not be possible for this stuff to replace foreign salt.

In short it may be said that according to Mr. Pitt there is no reasonable prospect of establishing salt manufacture in Bengal on a commercial basis. While there are patches of saline soil which lend themselves readily to illicit manufacture on a small scale by villagers who employ their wives and children for the purpose and are thus put to practically no expense, the tracts are too poor and too scattered to admit of manufacture on an extensive scale, except at a cost which would render production unremunerative. The climate of Bengal is altogether unsuited to the system of manufacturing salt by solar evaporation, while the cost of the fuel necessary in the process of manufacture by boiling is now prohibitive. Nevertheless, the Government of Bengal have issued temporary permits to several prospective manufacturers for carrying on experiments in the saliferous areas. In 1934 a further investigation was carried out at the instance of the local Government, by experts deputed from Burma and Sind, with a view to ascertain the possibility of the Burma and Sind processes of manufacture being introduced in Bengal. It appears that some of the manufacturers have now been making efforts in that line.

(*m*) PRESENT ATTEMPTS AT MANUFACTURE.

(*i*) *Bengal.*

Attempts were made to revive the local manufacture during War days, when the imports of foreign salt decreased. Experimental works were erected by a firm in 1919, but the scheme failed owing to high cost of production and transport. The Salt (Additional Import Duty) Act, 1931, again focussed attention on this matter and in 1932-33 five firms and one person were granted licences to manufacture salt. Three more firms were granted licences in 1933-34. Some of them started factories at Kadua on the sea board near Contai in the Contai sub-division of the Midnapore District and at Kagdwip in the district of 24-Parganas, and tried to manufacture salt from saline earth by primitive methods. During 1934-35 four firms and six persons were granted temporary permits for the manufacture of salt. Most of the permit-holders are reported to have done nothing in the matter of manufacturing salt. In Midnapur district there are three or four permit-holders. Their places of manufacture are

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*Since Mr. Pitt reported, one group of Madras factories has been transferred to Orissa.

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at Purushothampur, Dadanpatra and Sherpore respectively. The process of manufacture is the crude and primitive process of boiling saline water obtained by lixiviation without the aid of any machinery or scientific device. One of the firms is applying the Burma process by preparing a number of salt beds, the water passing from one to another in succession and gradually increasing in strength by the natural process of solar evaporation, the density of the water in the last bed being something like 22°B. This final preparation is collected in a tank and is then boiled in furnace and salt is produced. The manufacture is yet in an experimental stage.

In the district of 24-Parganas a firm is manufacturing salt. The total produce during 1934-35 was only 13 maunds. The Company have not been able to run their business on a commercial scale.

In Chittagong there are some 5 or 6 permit-holders, but only one firm has started work in Mouza Fulchari within the Cox's Bazar Sub-Division.

There is a demand for the organised development of the salt industry in Bengal. All reasonable facilities have been given both by the Central and local Governments to intending manufacturers, for the development of the salt industry in Bengal on a commercial scale. But in Chittagong the flourishing industry that has sprung up in the salt bearing tracts in disregard of the limits of the Delhi Pact concessions must be suppressed before organized manufacture can work with a profit.

During 1934-35 the Government of India deputed two salt officers, one from Sind and the other from Burma to investigate the possibilities of manufacture of salt in Bengal by methods adopted in Sind or Burma or by combination of methods of both the provinces.

As a result of this investigation Government were impressed with the feasibility of the manufacture of salt in Bengal, particularly in the Cox's Bazar sub-division of the Chittagong district, by the Burma method. This method consists in solar evaporation of sea water in a series of surface condensers with progressive increase in density, storage of saturated brine in a big reservoir and final separation of salt by heating the brine and consuming fuel. To clear up certain doubtful points the Bengal Government deputed an officer of theirs to make some supplementary enquiries. These enquiries indicated that if a factory of 30 acres is operated in the above site the cost of production would be 9 annas 1½ pies in the first year, 8 annas in the second year, 7½ annas in the third year, 6 annas 10½ pies in the fourth year and so on. Assuming that the price of sea-borne salt at Chittagong would be Rs. 45 per hundred maunds (which price prevailed at that time), or 7 annas 2 pies a maund, it was estimated that with a view to assisting the local industry it would be necessary to give it a subsidy for the first three years only and that after that period production would be so enlarged as to enable the concern to stand the competition of imported salt without the continuance of the subsidy. The Government of India have accordingly sanctioned the grant of a subsidy at the fixed rate representing the difference between the cost of production given above and the selling price of imported salt (7 annas 2 pies per maund) on the total quantity produced. The subsidy has been sanctioned in favour of the Chittagong Trading Union who have already commenced operations at Fulchari in Chittagong district. With a view to ensure

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that the subsidy is not continued in the absence of substantial progress it has been laid down that no subsidy would be paid in the second and third years unless the outturn in the first and second years reached the figures of 5,000 maunds and 8,000 maunds respectively. Sanction has also been accorded to the entertainment of a supervising staff to be posted at the factory. The cost of the subsidy and of the supervising staff will be met from the Central Government's $\frac{1}{8}$th share of the proceeds of the additional import duty on foreign salt to which reference has been made later in this chapter.

In 1934, with a view to testing the possibility of manufacturing salt in Bengal on the cottage industry basis as suggested by Mr. Pitt and in order to meet the public demand for Government assistance towards local production of salt, the Government of India sanctioned the establishment of two bonded warehouses one at Contai in Midnapur and the other at Cox's Bazar in Chittagong for the storage of locally-made salt purchased by the contractors and for its removal therefrom on payment of duty. The warehouse at Contai was started first and it was decided to postpone the establishment of the warehouse at Cox's Bazar until it was clear from the working of the Contai warehouse that there was some prospect of success for the Cox's Bazar portion of the scheme. Though the Contai warehouse was started in the latter part of 1933-34 and continued in 1934-35 and 1935-36 the experiment proved a failure as the contractors were unable to purchase any salt from the villagers, the prices at which the latter could be induced to sell salt continuing to be too high to leave any margin of profit to the former after payment of duty and meeting other contingencies. No salt was brought to the warehouse for storage and it stood idle throughout the period of its existence. It was therefore closed with effect from the 31st March 1937 and it was decided to abandon the proposal to start a warehouse at Cox's Bazar. The warehouse at Contai involved the expenditure of a considerable sum of money on preventive establishment and incidental expenses, which was debited to the Central Government's share of the proceeds of the additional import duty on foreign salt.

(*ii*) *Orissa.*

With regard to the possibility of manufacture of salt in Orissa Mr. Pitt writes in his report, " it cannot be said at once that manufacture by any process on a commercial scale is impossible. The evidence is not such as to justify optimism and barely sufficient to justify investigation on an experimental scale. But experience may prove that manufacture at an economic rate to supply demand is feasible ". Accordingly the local Government decided to grant a licence, on the application of the Raja of Parikud, for the manufacture of Karkatch salt in Chilka giving him a monopoly in the district of Puri for 5 years. Government have also promised the Raja to build at their own cost temporary structures for the preventive staff and to bear the cost of such staff for the first three years if the experiment is made by him.

In accordance with the suggestion made by Mr. C. H. Pitt in his report, the Government of Bihar and Orissa have instructed their Excise Commissioner to collect brine samples at different places of the seashore of the three saliferous districts of Cuttack, Puri and Balasore, and to get them analysed for the benefit of those who may intend to manufacture salt. The readings are being taken once a fortnight in the dry season, *i.e.*, from the end of November to the end of June each year and once a month in the rainy season. It is proposed that one complete analysis of brine should be made once a year or once only in two or three years while the others will be restricted only to finding out the specific gravity and the total amount of solids in solution. The whole cost of these operations is being borne by the local Government.

In order to check the illicit manufacture of salt practised by the people in the Astrang area of the district of Puri in violation of the terms of the concession granted in pursuance of the Delhi Pact of March 1931, the Government of Bihar and Orissa are considering the question of granting licences for the manufacture of salt in that area on cottage industry basis, but no final decision has been arrived at yet in the matter.

(*n*) PREVENTIVE MEASURES.

The great bulk of salt consumed is easily and cheaply taxed at the ports of entry. In the interior of Bengal, preventive measures are in the hands of the Commissioner of Excise and Salt under the local Government. Till 1930-31 the Excise staff used to patrol the saline tracts and destroy the spontaneous salt whenever it was found. The Delhi Pact of March 1931 has, however, permitted local residents in villages, immediately adjoining areas where salt can be made or collected, to collect or make salt for domestic consumption or for sale within such villages, but not for sale to or trading with individuals living outside them. In accordance with this agreement, the preventive officers do not interfere with the manufacture of salt by villagers in saliferous areas or its sale by them in neighbouring markets or bazars. But an abuse of the concession is inferred when salt is removed in carts or by means other than on foot. A statement of the number of salt cases detected during the past few years is given below :—

Year.	No. of cases.	Year.	No. of cases.
1924-25	403	1930-31	256
1925-26	239	1931-32	2
1926-27	335		
1927-28	274	1932-33	9
1928-29	218	1933-34	26
1929-30	94	1934-35	75

The increase in the number of cases in 1930-31 was due to the political campaign against the salt tax, followed by the Delhi Pact, which accounts for the sudden drop since 1931-32. There have been flagrant abuses of the salt concessions since 1933-34 and cases of smuggling of non-duty paid salt appear to be on the increase.

In Orissa the preventive work in the saliferous districts of Cuttack, Puri and Balasore is under the Commissioner of Salt and Excise. The prohibitory orders of the Government of India against prosecuting people collecting or making salt in areas adjoining the villages in which they reside for their domestic consumption are in force. In general the concession has not been much abused. In 1933-34, 361 maunds 25 seers of salt were seized and only one case was instituted.

(*o*) HISTORY OF ADMINISTRATION.

In the times of the East India Company the Board of Revenue controlled the Salt Department. Government depots, storehouses and excise golas existed side by side with private Inland Bonded warehouses. In 1889-90 the administration of Orissa was transferred from the Government of Bengal to that of Madras to prevent illicit practices rampant at that time. Illicit manufacture of salt then increased in the maritime districts of Bengal and about 1898 a separate Salt Department for Bengal was created with administrative and preventive staff. The factories in Orissa were closed and preventive work again handed over to this Department. The control of the saltpetre refineries in Bengal was also transferred from the Northern India Salt Revenue Department to the Bengal Government in 1901. At present the salt golas in Bengal other than the Inland bonded Warehouses are administered by the Central Board of Revenue through the Collector of Customs, but matters relating to inland preventive work, control of inland bonded warehouses, control of saltpetre refineries and soda factories and remission of duty on salt including educed salt used for industrial purposes and manufacture of salt are administered by the Government of Bengal through the Collectors of districts and the Commissioner of Salt and Excise. For this work the Bengal Government get an annual contribution from the Central Revenues.

The separate province of Bihar and Orissa was created in 1912. At that time the Commissioner of Salt and Excise, Bihar, took over charge of the preventive operation in the three saliferous districts of Cuttack, Balasore and Puri. The control of these operations has now passed to the officers of the separate Government of Orissa. The control of the saltpetre industry in Bihar still rests with the Commissioner, Northern India Salt Revenue Department.

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CHAPTER XXI.

Foreign Salt in India.

(*a*) HISTORICAL.

Local manufacture of salt went on in Bengal along the sea coast long before the British appeared on the scene. The East India Company developed a system of monopoly, which survived with modifications till 1862. Up to 1816 the import of foreign salt was prohibited. Foreign salt was first imported into Bengal in the year 1818-19. No large importations, however, occurred until the year 1835-36. Even in 1835-36 only 2,84,858 maunds were imported. There were big obstacles in the way of foreign salt in the shape of high import duty and penal bonding regulations, which evoked a powerful agitation from manufacturers, shipowners and trade magnates of England who tried to persuade the Court of Directors to abolish the East India Company's salt monopoly. Customs duties were at the outset levied on imported salt at rates fixed with reference to the average prices realised at the auction sales for salt made at Government agencies, but the fixed rate of duty introduced under the orders of 1837 was applied to imported as well as to the locally manufactured salt. The repeal of salt duties in England about 1825 gave a great impetus to the salt industry there, and Liverpool salt began to be imported into Bengal in large quantities. As shown in the Chapter on Bengal, the indigenous industry could not stand in competition with cheaper and better quality foreign salt and gradually died out. Government abandoned monopoly in 1863, leaving manufacture subject to Excise duty only until 1898 when the local manufacture was prohibited altogether. Since 1863 foreign salt has been the mainstay of Bengal. In 1851-52 the quantity of imported salt amounted to 31,74,370 maunds. Imports gradually increased. In 1861-62 they were 61,28,726 maunds, in 1889-90, 1,00,70,962 maunds and in 1911-12 about 1,34,86,000 maunds. Now-a-days imports vary from 130 to 140 lakhs of maunds. Imports in Burma have varied from 12 lakhs to 25-26 lakhs per annum.

(*b*) COUNTRIES OF ORIGIN.

Before the passing of the Additional Import Duty Act in 1931, salt was imported from England, Germany (Hamburg and Bremen), Aden, Egypt (Port Said), Spain (Torrevieja on the coast of Valencia), Italian East Africa (Massowah, Assab) in the Red sea and Roumania. Bengal and Burma divide the whole supply. Indian sources such as Karachi, Bombay, Madras and States in Kathiawar also send salt to Bengal and Burma. Imports of foreign salt into other provinces are negligible. In Bengal salt is at present practically imported only from Germany (Hamburg), Aden and Indian sources. Imports from other sources namely England, Spain, Port Said and the Red Sea ports (Massowah and Assab) have practically stopped. Burma is still importing some salt from England, Port Said, and Italian East Africa.

(*c*) DIFFERENT VARIETIES.

Liverpool salt termed 'Panga' salt in India is obtained by boiling brine pumped from mines. It is pure white in colour and has fine

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crystals. It used to fetch the highest price ; Rs. 8 or Rs. 10 per 100 maunds more than solar salts and until recently was very popular in Bengal and Assam. Dryness, whiteness and evenness of grain are its chief characteristics and it is taken a standard in Bengal. What remains of the market for this quality of salt has been captured by Germany.

German salt is rock salt obtained from mines and is imported crushed. Its chief characteristic is its dryness and immunity from wastage due to climatic conditions.

Spanish salt is white salt of good appearance, is obtained by solar evaporation of sea brine, has a larger percentage of sodium chloride than any other imported solar salt and is drier than Liverpool or Aden salt. It comes either uncrushed Kurkutch or fine crushed by being passed through rollers. It was first imported in 1904 and steadily gained ground. Imports of this salt have practically stopped.

Mossowah salt is also a product of solar evaporation. It came first in 1909-10. Its quality has improved greatly since its first importation. It is whiter and finer than Port Said and Aden salt. It comes only in crushed form.

Port Said salt is obtained by solar evaporation and imported both in the natural state and crushed form. In the beginning about 1905 it was unpopular owing to its moisture, poor quality and reddish tinge. Its quality gradually improved. Being cheaper than the English, German or Spanish product, its imports greatly increased, until the time of the imposition of the additional duty.

Aden salt is manufactured from sea water by solar evaporation and imported either in Kurkutch or fine form ; it headed the list of salts imported into Bengal in 1914-15 and in 1917-18 was second on the list both in Bengal and Burma. It is very popular on account of its cheapness. It is available in many qualities such as Aden Fine, Aden Solar Fine, Little Aden Fine, Indo-Aden superfine. During the last four years its imports have enormously increased, and it now heads the list of imported salts in Bengal. In Burma its imports are next to German Salt.

Djibouti salt is manufactured from sea water and is crushed. It is whiter than Aden.

Ras Hafun salt.—Big salt works have been opened at Ras Hafun on the coast of Italian Somaliland. Ras Hafun fine salt is a high quality Red Sea salt.

Assab salt is a Red Sea salt of slightly inferior quality.

Roumania salt is crushed rocksalt from Roumania Mines.

Formerly salt was also imported from Salif in Kamaran Island off the Yemen coast of the Red Sea. Salt also used to come in both Karkatch and fine form from Rawaya on the Egyptian coast of the Red Sea. Salt was also imported from Persian Gulf (Muscat, Hanjam and Linga). These are, however, no longer imported.

(*d*) SYSTEM OF IMPORTS.

Salt is imported all the year round. Liners from Liverpool and Hamburg bring salt as keel ballast. From Spain and Port Said salt is brought in complete ship loads. Importations from all sources are heavy previous to jute export season as tramp steamers bring full cargo loads of salt and carry away jute. Salt from Aden is imported chiefly by tramp steamers which bring coal from Europe to Port Said and then salt to India from Aden.

Supplies and imports of foreign salt vary accordingly to shipping facilities, which in turn depend on external political conditions and to some extent on India's exports of jute and tea. Bengal, however, depends solely on imported salt. Bihar, though consuming about 40 lakhs, does not show such determined preference for it as Bengal.

(*e*) IMPORT FIGURES.

Imports of salt into Bengal and Burma during the last 15 years are shown below. They are shown in lakhs of maunds :—

Year.	Bengal.	Burma.	
1911-12	134·86	16·91	Burma figures against these years are for the calendar years from 1912 to 1919
1912-13	137·03	17·07	
1913-14	146·70	19·27	
1914-15	108·29	17·35	
1915-16	134·24	16·32	
1916-17	95·27	11·47	
1917-18	83·79	12·39	
1918-19	100·96	11·11	
1919-20	108·38	10·16	
1920-21	156·06	12·23	
1921-22	116·50	15·48	
1922-23	132·59	16·79	
1923-24	103·16	18·81	
1924-25	151·73	21·75	
1925-26	136·92	22·17	
1926-27	132·20	21·65	
1927-28	145·24	24·63	
1928-29	150·37	23·37	
1929-30	162·46	25·89	
1930-31	172·24	24·51	
1931-32	135·09	13·51	
1932-33	156·25	22·43	
1933-34	123·28	10·76	
1934-35	140·06	15·63	

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Imports by countries of origin during the last four years are given below in maunds :—

Countries. ..	1931-32.	1932-33.	1933-34.	1934-35.
Liverpool	5,38,655	6,45,068	19	16
Hamberg	3,10,010	7,56,696	10,50,263	9,35,360
Spain	..	5,64,165	..	..
Port Said	3,54,606	5,63,251	74,211	53,842
Aden	83,22,781	79,11,327	76,83,657	72,51,657
Bombay	9,19,132	3,56,232	4,28,529	4,32,023
Karachi	7,56,571	9,44,860	8,50,194	21,13,058
Okha	3,54,462	9,19,296	10,38,586	15,78,300
Djibouti	..	1,41,300	..	..
Assab	5,03,243	10,23,340	..	..
Tuticorin	4,53,099	4,02,128	2,97,799	4,17,932
Ras Hafun	8,01,214	11,07,401	2,00,620	1,12,022
Navalakhi	1,95,345	1,92,520	3,58,150	4,92,081
Nadir (Porbandar)	..	97,460	3,46,320	6,19,570
Madagascar	..	..	272	..
Total ..	1,35,09,118	1,56,25,044	1,23,28,620	1,40,05,861
Burma.				
United Kingdom	1,43,937	17,892	4,063	5,384
Aden	11	..	1,94,544	3,81,593
Germany	3,81,351	8,53,009	4,78,549	7,11,831
Spain	97,843	1,93,127	62,187	..
Port Said	2,35,589	5,25,355	2,35,599	3,03,470
Italian East Africa ..	4,76,536	6,46,452	95,278	1,54,787
Indian Ports	15,185	6,615	5,282	2,719
Other Countries	141	182	121	3,687
Total ..	13,50,593	22,42,632	10,75,623	15,63,471

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In Bengal the Liverpool salt had about 75 per cent. share of the total imports from 1873 to 1903, Aden about 11 per cent. and the rest of the countries about 14 per cent. only. Before the War England was the biggest supplier and then came Aden, Spain, Port Said, etc. But now Liverpool has practically lost both the markets, Bengal and Burma. During 1934-35 only 16 maunds of this salt were imported into Bengal. Aden is at present the biggest supplier and controls about 50-60 per cent. of the Bengal market. German salt still retains about 6-7 per cent. of the market, the rest 35-40 per cent. has been captured by Indian salts from Karachi, Okha, Morvi, Porebunder, Madras and Bombay.

In Burma the same thing has happened. Imports of English salt have dwindled, and those of German and Port Said salts have increased. At present German salt heads the list of imported salts in Burma. Aden manufacturers have now turned their attention to Burma and Aden imports are rising. Apart from quality, price is the determining factor in the demand for any particular kind of salt. The tendency during the last 40 years has been for the cheaper solar salts to replace the dearer English salt.

(*f*) PRICES.

Liverpool salt is the dearest. Before the War the rate of this salt was about Rs. 50 per 100 maunds, while the rates of other varieties varied from Rs. 40 to Rs. 45. The price of salt in Calcutta market fluctuates violently. Freight is an important factor and any variation in freight affects the price of salt. During the War there was an acute shortage of tonnage and so freight rates rose up and imports of salt were at their lowest. Prices in 1917 went up to Rs. 434 per hundred maunds and so in 1918 the Bengal Government fixed a maximum rate *ex*-gola varying from Rs. 239 to Rs. 248. Another cause of fluctuation in prices has been the operation of Combines and speculations on the part of dealers. Three or four times a Combine has been formed with the ostensible object of stabilizing prices but in reality to retain market against new importers. The price is also affected by irregular arrival of salt shipments. The following statement shows the average wholesale prices of salt *ex*-ship per 100 maunds at Calcutta :—

Year.	Rupees.	Years.	Rupees.
1911	68	1923	80
1912	66	1924	79
1913	62	1925	58
1914	55	1926	68
1915	110	1927	104
1916	146	1928	88
1917	274	1929	66
1918	187	1930	48
1919	172	1931	56
1920	130	1932	64
1921	113	1933	40
1922	100		

Details of prices of various kinds of salt during all quarters of the years 1930-31 to 1934-35 have already been given in the Bengal Chapter.

(*g*) System of sales and issues.

The control of the importation and issue of foreign salt is in the hands of the Collector of Customs working under the control of the Central Board of Revenue. The imported salt passes into consumption by payment of duty direct from shipboard or from the salt golas at Howrah or Chittagong or from the inland bonded warehouses.

(*i*) *Bonded in bulk.*—As soon as possible after the arrival of the ship, and on the Agents' application, weighing tubs, scales and fittings are sent on board. The salt is brought up from the hold and swung into a 20-maund tub which discharges into a wooden chute slung outside the ship. The chute takes the salt into the barge below. When the required quantity has been discharged, the salt in the boat is adulled, that is stamped all over with a wooden stamp, and a protective boat note is granted. The hatches are then put on and sealed, and the boat is despatched to the salt golas in work. On arrival at the golas an Inspector in charge examines the papers, and if every thing is correct, discharge commences, salt being carried from the barge on coolies' heads.

(*ii*) *Duty-paid in bulk.*—Bills of entry are despatched on board under sealed covers to the Customs Officer in charge. Before delivery of duty-paid salt, the merchant, or his licensed representative produces a delivery order granted by the Agents and addressed to the master of the vessel, with a cash receipt. These are compared with the Bill-of-entry and discharge is allowed. The method of delivery for duty-paid salt is the same as for salt discharged for Bond. On completion of each boat, the salt is adulled, a boat note granted and the boat released. A percentage of boats is check-weighed under the supervision of the salt Inspector of the Golas.

(*iii*) *Duty-paid in bags.*—The salt is taken up from the hold, stored on deck, and shovelled into 2 maund tubs and weighed. The tubs are then emptied into bags which are sewn and loaded into boats.

(*iv*) *Deliveries* ex-*Golas.*—When a merchant requires salt from the golas he presents his bill of entry and delivery order to the Inspector. The salt is then weighed in 2-maund tubs, the Preventive Officer watching the weighment. As each bag is taken away, the officer hands a cowrie to the coolie and also keeps a tally on the tally sheet. The cowries are dropped by the coolies into a bucket on the railway platform, or on the boat, and provide a useful check on the tally sheet.

Extensive deliveries of salt occur *ex*-board ship direct, only about 20-30 per cent. coming to Golas. During 1934-35, 1,09,16,849 maunds were cleared *ex*-ship and 23,71,951 maunds *ex*-gola.

(*v*) *Non-duty paid salt.*—An account of the inland bonded warehouses has already been given. Salt intended for the inland bonded warehouses may be discharged by day or night into boats. The discharge into flats direct is permitted by day only. The boats when laden are despatched to the flat in charge of a churrundar (man specially appointed by the Customs Department for this work). The salt is transferred on board the flat under the supervision of a Preventive Officer. The hold into which the salt is stored must be entirely separated from others, having hatch covers capable of being sealed. No other cargo must be stored in these holds. When the whole consignment is completed, the salt is adulled, and the three parts of the Special Salt Pass made out. A specimen of the seal placed on the hatches is impressed on each, the number of the adul, with the number of seals on the hatch is entered on the Pass. One part of the Pass is forwarded to the Collector of the District in which the inland bonded warehouse is situated, the second is made over to the serang of the flat, and the third is retained in the Customs Department.

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CHAPTER XXII.

Recent Developments—Making India self-supporting in salt.

(a) INTRODUCTORY.

It has been seen in the Chapter on foreign salt that India imports about 5,70,000 tons (160-165 lakhs of maunds) or about 25-30 per cent. of her total annual consumption of salt. This salt is imported into Bengal and Burma. Until recently most of this salt came from foreign countries. Indian opinion has been adverse to this import and has often strongly expressed itself in the Assembly. In 1926 the Indian Taxation Enquiry Committee stressed the overwhelming importance of a well developed salt industry to India for her economic advance and reported that it was desirable to make India self-supporting in the matter of her salt supply and recommended an inquiry by the Indian Tariff Board. The Central Board of Revenue examined these proposals. The problem according to the Board was whether the Bengal market could be supplied by Indian sources. The Board ruled out the possibility of Northern India Salt Sources supplying this market because of the long railway lead and consequent prohibitive freight rates. They considered Bombay salt to be so inferior as not to be able to find any market in Bengal and they ruled out the Sind sources near Karachi as incapable of further expansion because of shortage of labour supply. Tuticorin salt they thought was fit for Bengal, but the production could not be appreciably increased as pit brine was used, the supply of which was limited. The Government of India accepted the views of the Central Board of Revenue, and the matter was not referred to the Tariff Board. The Assembly, however, again pressed the matter and Government agreed to refer the matter to the Tariff Board in 1929. The Tariff Board was asked to report, " whether having regard to all relevant considerations it is desirable in national interests to take steps to encourage the production of salt in India suitable for markets now served by foreign salt and what measures were to be adopted ".

(b) TARIFF BOARD'S REPORT.

The Board examined the question and submitted their report in September 1930. Their main conclusions are shown in an outline below :—

(1) That fine white crushed salt of the quality requisite to enable the foreign article to be entirely replaced in the Bengal market could be produced in sufficient quantities and at a reasonable price in India.

(2) That for this purpose Aden should be treated as part of India. The following reasons led the Board to regard it as such. On the civil side Aden is subordinate to Bombay Government (though perhaps its administration may undergo changes presently). Aden has four salt works out of which three are in Indian hands. Aden manufacturers pay ground-rent and royalty rent to Bombay Government and are liable to Indian income-tax. Most of the superior labour employed is Indian. During War time, Aden, Karachi and Okha stand on the same footing since all are liable to have their line of communication with Bengal stopped owing to stoppage of shipping

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facilities. Besides, Aden has been a pioneer in supplying India with fine, white salt. It has Indian vested interests. India also is not likely to be able to dispense with Aden salt. So the Tariff Board did not discriminate between Aden, Karachi and Okha.

(3) That in order to develop Indian production to this extent the main desideratum was the stabilisation of prices at a fair level in relation to the cost of production.

(4) That Rs. 66 per 100 maunds *ex*-ship at Calcutta, would represent such a fair level, and would not be burdensome to the consumer compared with the average of prices in the past, and

(5) That the greatest public advantages would be derived from making India self-supporting, if the Northern India Sources were developed, so that the Bengal market would be supplied to a large extent by rail-borne rather than by sea-borne salt. The development of the Indian sources would secure the following advantages :—

(*i*) A guarantee against shortage in War time.

(*ii*) Additional traffic for Railways.

(*iii*) Additional business for Indian steel, iron and wagon companies, and a reduction in the price of salt at the Northern India sources as a result of increased production.

(*iv*) The advantages that would follow the development of the supply of sea-borne salt of Indian origin to the Bengal markets they definitely pronounced to be of insufficient importance from the national point of view to justify by themselves the placing of any considerable burden on the Indian consumer. Indian sea-borne salt was only to be encouraged so far as might be necessary to make up any deficiency in the supply, and without undue hardship to the consumer.

The measures advocated by the Tariff Board for giving practical effect to their conclusions were, briefly, as an *interim* measure, the immediate assumption of the control of the imports of salt into Bengal by the Government, which was to buy all the salt and sell it at standard rates and ultimately the constitution of a Marketing Board, subject to such degree of statutory control as might be necessary in the public interests for regulating the salt trade throughout India. One of their recommendations was that Government should undertake a thorough inquiry into the potentialities of the various salt sources of India. This enquiry was entrusted to Sir Chuni Lal Mehta and Mr. C. H. Pitt, late General Manager, Salt Range Division, Khewra, who submitted their report (Salt Survey Committee's report) in 1931.

(*c*) Steps taken by Government.

In January 1931, on the motion of Sir George Schuster, the Legislative Assembly sanctioned the appointment of a Committee of ten members of the House to consider the Tariff Board report on the Salt Industry as also the report of the Salt Survey Committee. After the two reports had been examined by the Committee set up by the Assembly, that Committee recommended the immediate imposition of an additional duty of 4½ annas per maund on all salt Indian or foreign imported by sea into British India. It also recommended that the executive be empowered to increase the duty up to one anna per maund, if further fall in prices of foreign imported salt justified it, the object being to adjust the price of such salt *plus* duty as nearly as possible to the level of the fair selling price as defined by the Tariff Board.

The Committee further recommended that a rebate equal to the additional duty should be granted on the imported Indian salt, on the producer undertaking to deliver a stipulated quantity of salt to the Government at any time at the fair selling price fixed by the Tariff Board.

The proceeds of the duty which would amount to about Rs. 34 lakhs, were to be ear-marked for the development of Northern India Salt Sources, for investigation into the development of other sources, for example in Bengal, Bihar, Orissa and generally on the East coast and for any measures necessary to secure the stabilisation of prices such as the establishment of a Marketing Board and provision of working capital and reserves for such a Board. Any balance of the proceeds of the duty was to be distributed to the provinces consuming imported salt which would bear the burden of the extra duty. The report was not unanimous. One or two members emphatically dissented from the report in the interest of the Bengal consumer. One of the members was afraid that a large protective duty to Aden manufacturers might be utilised to strengthen their position and retard the full development of India's production.

(*d*) SALT (ADDITIONAL IMPORT DUTY) ACT, 1931.

The recommendations were embodied in the Salt (Additional Import Duty) Act No. XIV of 1931 which came into force from 18th March 1931. Under this a duty of Re. 0-4-6 per maund was levied on all salt Indian or foreign imported by sea into British India and a rebate equal to this was to be allowed on imported Indian salt, Aden being considered a part of India. Imports by land from the Portuguese and French India too were subject to this duty. Later on the Act was extended to the end of 1932-33.

The object of the Act was to stabilise the prices of salt, to assist the Indian Salt Industry against foreign competition in the Bengal market and to secure to the Indian manufacturer an economic and fair selling price for the salt that he may export to that market. This extra duty was opposed by Bengal and Assam on the ground that they would have to pay extra for a necessity of life, that the masses would be stinted in the use of salt and that per capita consumption of Bengal, Assam and Burma would fail, and the only people who would gain would be a handful of producers at Karachi and Okha. They argued that it was invidious to increase the privations of the consumers in East India merely to encourage the development of salt manufacture in Western India.

The effects of the additional duty which came into force from 18th March 1931 were noticeable within a few months. The prices of salt in the Calcutta market were stabilized at the level indicated by the Tariff Board. Imports of foreign salt declined. They fell from 3,58,979 ton in the period 1st April to 31st December 1930 to 1,13,462 tons in the corresponding period of 1931. The demand for Indian salt increased. The Tariff Board's figure Rs. 66 per hundred maunds *ex*-ship gave Indian producers a reasonable margin of profit and made it possible for them to expand their works.

Considerable increase also occurred in the imports into Calcutta during the period April to December 1931, from Karachi and Okha, Karachi rose from 14,267 to 18,095 tons and Okha from 3,186 to 13,021 tons, while Navalakhi from which there were no imports in the period already mentioned in 1930 sent 5,323 tons in the same period in 1931. The production of Aden too was enormously stimulated; each of the four concerns there had a record output during 1931. The combined output of all four in 1931 was 2,85,459 tons, against the highest previously recorded figure of 2,38,536 tons. Exports from Aden during the period April to December 1931 (most of which went to Bengal) considerably exceeded the export to all destinations for any previous complete financial year.

During 1932-33 too imports into Bengal from Aden and Indian sources kept on increasing. Aden supplied 79,11 lakhs (50.63 per cent.), Okha 9.19 lakhs (5.89 per cent.), Karachi 9.44 lakhs (6.04 per cent.), Navalakhi (Morvi State) 1.92 lakhs (1.23 per cent.), Porbandar .97 lakh (62 per cent.), Madras 4.02 lakhs (2.58 per cent.), Bombay 3.56 lakhs (2.27 per cent.), and all the foreign countries (England, Germany, Red Sea sources, etc.), together 30.74 per cent. of the total imports.

On the 1st April 1931 the Legislative Assembly adopted a resolution sponsored by the Finance Member under which seven-eighths of the additional import duty was to be distributed among the provinces consuming imported salt and the balance of one-eighth was to be devoted to the development of Northern India Salt sources and to the investigation of the possibility of development of other sources in India. The proceeds of the duty are being expended on these lines. During the debate on the above Resolution in the Assembly particular stress was laid on the desirability of conducting investigations into the possibilities of salt production in Bengal. The Government of India followed up this suggestion by deputing Mr. C. H. Pitt, late General Manager, Salt Range Division, Khewra, to make the necessary investigations in Bengal and Orissa, visiting such places as might appear to afford opportunities of salt production. Reference to this enquiry and to Mr. Pitt's recommendations has already been made in these pages.

(*e*) SALT ADDITIONAL IMPORT DUTY (EXTENDING) ACT, 1933.

The Salt Industry Committee of the Legislative Assembly further reviewed the position of the industry in March 1933 and recommended stabilization of price level at Rs. 54-12-0 per 100 maunds *ex*-ship taking into account the reduction in shipping freight, and reduced the protective duty to 2 annas 6 pies per maund to lighten the burden on the consumers of imported salt. The proposal was adopted and embodied in the Salt Additional Import Duty (Extending) Act, 1933, which came into force from 30th March 1933. This reduction of extra duty did not result in any increase in imports of foreign salt. During 1933-34 imports from Aden and the Indian sources into Bengal increased still further and the share of the foreign countries fell from 30.74 per cent. in 1932-33 to 10.82 per cent. in 1933-34. In Burma Indian salt has not made much headway. Aden is capturing the market there as well.

The Salt Industry Committee of the Legislative Assembly met again in February 1934 and recommended the continuance of additional protective duty at 2 annas 6 pies per maund and the stabilisation of price level at Rs. 50 per 100 maunds instead of Rs. 54-12-0. The Act was accordingly extended up to 30th April 1935 with this modification and was next year further extended up to the 30th April 1936.

Two or three deputations on behalf of the Indian Salt Association and the Karachi Salt Association waited on the Finance Member in December 1935 and January 1936. They described the growth of the industry and stressed the need for further protection for some years. In April 1936 the Legislative Assembly passed the Bill extending by two years the operation of the Salt (Additional Import Duty) Act of 1931 subject to a reduction of the rate of duty to one and a half annas. Thus the present additional duty is one anna and a half a maund.

(*f*) INDIAN SOURCES—POTENTIALITIES AND DEVELOPMENT SCHEMES.

(*i*) *Northern India Sources.*

The Tariff Board laid great emphasis on the development of the Northern India Salt Sources. The Board were not so keen on the sea-borne salt of Indian origin as on the rail-borne. Khewra, Sambhar and Pachbadra are the main Northern India Sources considered by the Board. They were of the opinion that these could increase their output by 150,000 tons (42 lakhs of maunds).

1. *Khewra.*—The Khewra Mine contains huge reserves of salt. The deposits extend over a mile and are over 600′ thick. In 1870 Dr. Warth estimated the mine Reserves at 2,000 lakhs maunds or about 7 million tons. Recent investigations by the Geological Survey of India show the minimum reserves to be 4 million tons. The usual output has been about 30 lakhs maunds or about 100,000 tons per annum. The mine could produce 60 lakhs of maunds or 200,000 tons annually. The Salt Survey Committee, however, were doubtful whether this output could be maintained for long periods by the present labour and consequently suggested the introduction of machinery to bring down the rates of excavation to as low a figure as possible to enable crushed salt to compete successfully in Bengal.

The Khewra Crusher scheme was put forward by Mr. C. H. Pitt, late General Manager, Salt Range Division, Khewra. The scheme has the following as its main features :—

An electrically driven creeper hauls the loaded tubs up to a high point and on to the power driven tippler which tipples the tubs over and empties them on to a chute. The empty tubs then go on to a separate siding. The salt as it comes out of the tubs falls on to 6″ screen bars, oversize passes over to the chute to a picking belt conveyor 40′ long where impurities are picked, and the salt automatically falls into the broadgauge wagons shunted on to the mouth by electric winches. This goes to the Punjab market. Undersize salt passes over 2″ screens, oversize from which goes to the rock-breaker at the bottom. The stuff coming out of the rock-breaker and 2″ screen

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undersize is lifted up by an elevator and fed on to a picking belt and to the travelling conveyor which feeds the stuff into a bin. From the bin the stuff is automatically fed into the two pulverizers which reduce it to powder. From the pulverizers the dust salt passes on to a conveyor belt again and is lifted by a second elevator to the dust salt bin. From there it is to be filled into bags and dispatched to the Bengal market.

It was proposed to raise the output to 45 lakhs in the beginning, 30 lakhs as usual for the Punjab market and 15 lakhs for Bengal, though the Crusher plant has been designed to deal with a total output of 60 lakhs. This scheme has cost about two lakhs and thirty thousand rupees.

It was first thought that with an output of 60 lakhs the cost of crushed salt at Khewra would come to about 3 annas a maund. A specially reduced freight rate of Re. 0-11-0 per maund for crushed salt has been sanctioned by the Railways. The cost F. O. R., Calcutta works to Re. 0-14-0 or Rs. 88 per hundred maunds. It was expected that salt would compete very near Calcutta, if not at Calcutta itself. However, with the fall in prices of imported salt the possibility of the Khewra salt becoming a commercial proposition has been very much diminished. No salt has so far gone to Bengal. Khewra cannot be a potential source of adequate supply for Bengal, unless the Government subsidises it, but at the same time it will serve as a reserve in case of war or any other emergency, when salt cannot be imported into India.

2. *Pachbadra.*—The output of the source has varied from 4 to 11 lakhs. The question of the potentialities of the source is a vexed one. The Salt Survey Committee considered the source capable of producing 40-50 lakhs of maunds per annum. They recommended a thorough topographical survey to be done and thought that when fully developed Pachbadra could produce 1,00,000 tons for the Bengal market. The topographical survey of the Pachbadra salt basin was completed in April 1932. A rough provisional scheme for the expansion of the salt source at Pachbadra and crushing of salt for supply to Bengal was formulated by the Northern India Salt Revenue Department. It involved an expenditure of over Rs. 10 lakhs and provided for :—

(*i*) the lay-out of 25 long pits of the outside dimension of 3.207′ × 167′ in about 5 square miles of land, sub-divided into 6 compartments of 500′ × 90′. Each large pit is expected to yield about 1,20,000 maunds of salt per annum, and

(*ii*) transport of the salt extracted from these pits by mechanical haulage direct from the pits to a Central Store where the salt will be crushed, bagged and loaded for the Bengal market in the Railway's metre-gauge sidings and then railed to its destination.

Besides, it is also possible to manufacture at a small cost good edible pan salt from sub-soil brine. Pan salt can be manufactured quickly and can be made to augment the supply of pit salt.

It was estimated that on an output of 30 lakhs for the Bengal Market the cost of production would come to 2 annas 3 pies ; adding 4 pies for dispatch and 8 pies for crushing and Re. 0-10-4 railway freight to Calcutta, the cost F. O. R. Calcutta would be about Re. 0-13-7 a maund

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or about Rs. 85 per cent. maunds. It will be seen therefore that Pachbadra salt cannot be sold in Bengal unless and until the price of foreign imported salt is higher than Rs. 85 per hundred maunds. The price of imported salt in Calcutta is now in the neighbourhood of Rs. 50 per hundred maunds *ex*-duty and Rs. 54-11-0 inclusive of the additional import duty of Re. 0-1-6 per maund. This state of affairs rules out the marketing of Pachbadra salt in the Bengal Market in the present conditions. The scheme to expand the production of salt at Pachbadra with the object of placing its output in the Bengal Market had therefore to be abandoned.

5. *Sambhar Lake.*—Output has varied enormously ranging from 15 lakhs to 112 lakhs, the usual output being about 70-75 lakhs. The Tariff Board suggested that Sambhar salt might be supplied to the Bengal market. The Salt Survey Committee, however, were doubtful whether the salt would be acceptable to Bengal. They considered that the pan salt which was formerly manufactured from sub-soil brine obtained from wells sunk in the bed of the lake, would have a better reception in the Bengal market, as it was whiter than ordinary Sambhar salt, being free from algæ. An area of about 1,300 acres could be developed in three different sections and an output of 50 tons per acre or a total of 65,000 tons could be expected. The cost is bound to be high and so it was suggested that the work be given out on contract and in the beginning pan salt might be produced as an experimental measure, and its sodium chloride content and colour tested.

Moreover, by clearing of silt and reducing the slopes of the banks of the Sambhar and Nawa canals the supply of canal brine can be increased and an extra output of 10 lakhs maunds can be expected. The production can be increased to a crore of maunds—thus Sambhar could send 30-40 lakhs to the Bengal market.

The cost of production would work out to about 2 annas 5.4 pies per maund and that of crushed salt to 2 annas 9.4 pies. Under terms of Treaties, Royalty to the Jaipur, Jodhpur Durbars amounts to 3|5 of the selling price and so the selling price of crushed salt at Sambhar would be about 5 annas a maund and taking the freight to Calcutta at 8 annas a maund, the cost F. O. R. Calcutta would be Re. 0-13-0 a maund or Rs. 81 per cent. maunds.

As there did not appear to be much hope of ordinary Sambhar salt competing at Calcutta with foreign salt, steps were taken to send Reshta salt (fine grained wind salt) to Calcutta. 49,725 maunds of this salt were extracted during 1934-35 out of which 19,404 maunds were dispatched to Bengal. During 1935-36 3,66,702 maunds were extracted of which 188,454 maunds were dispatched. The B. B. and C. I. and E. I. Railways have allowed the following freight concessions on reshta salt on the representation of the Salt Department :—

(1) The minimum rate of 0.10 pie per maund per mile to each station.

(2) Plus 2 pies per maund for transhipment.

(3) Plus the rates from Howrah.

These concessions give reshta salt a fair advantage over imported salt. This salt is in great demand in certain parts of Bengal and Bihar. It is hoped that the sale of this salt will increase.

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Besides, a scheme to develop pan works and instal a crusher plant at Gudha is nearing completion. Indents for the plant have already been placed and the plant will probably be functioning by the end of 1936-37. Pan salt will be produced, crushed and sent to Bengal. A low selling price of 2 annas a maund has been fixed for the pan salt. 164,63 maunds of this salt were produced in 1935-36.

4. *Didwana.*—This is another source in Rajputana not mentioned by the Tariff Board. The output has varied from 3 to 7 lakhs per annum and can be increased; but the sodium chloride content of the salt is very low, being about 80 per cent.; so the salt is unfit for the Bengal market. The output can, however, be increased for the local market, where the salt is consumed.

(ii) *Sind. Sources.*

1. *Sea Sources.*—The salt industry at Karachi is capable of considerable expansion and improvement both from the point of view of quantity and quality. Even 70 years ago, Bruce reported as follows about its potential strength. "Along the sea shore, bounded by the outer branches which form the delta of the Indus, there is a sufficiency of salt to supply the world and were it not that there are no very suitable places of shipment from the want of sufficient depth of water, it is probable that the marine salt of Scinde would find its way into far distant foreign market."

Karachi sources possess many natural advantages, such as light rains, impervious soil, sea breezes, high density brine, etc., for salt manufacture. The Tariff Board and the Salt Survey Committee agree that there will be no difficulty in securing an adequate supply of labour for the increased output, a point about which the Central Board of Revenue were doubtful. Karachi works, when efficiently developed, will be capable of an output of 90 tons per acre. Grax Limited have an area of 562.86 acres which could yield 16-17 lakhs of maunds per annum. They exported 4,78,345 maunds to Bengal in 1933-34, 7,01,713 maunds in 1934-35 and 7,08,863 maunds in 1935-36. The Gulbai Salt Works have an area of 95.72 acres and are going to extend it by another 174 acres, and they could then produce about 18– 20 thousand tons. The Tariff Board's figure for these works was 25,000 tons. They exported 53,300, 63,000 and 1,75,408 maunds to Calcutta in 1932-33, 1933-34, and 1934-35 respectively. In 1935-36 their exports rose to 3,64,575 maunds. The Eduljee Dinshaw works from their present concession can supply about 22,000 tons and from another area now got by them 45,000 tons. They produced 10,37,165 maunds (over 35,000 tons) in 1934-35 and exported over 9 lakhs of maunds to Calcutta. During 1935-36 they exported 10,48,917 maunds. The Luxmi Salt Works and Government Salt Works now leased out cannot give a greater output without further extension.

Development Scheme.

Tariff assistance was granted to the Indian Salt Industry in March 1931. Since then the Karachi Salt Works have received a great stimulus.

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This will be clear from the figures of total output and exports to Calcutta :—

Year.	Output in maunds.	Exports to Calcutta.
1929-30	9,88,557	5,25,100
1930-31	9,04,941	4,92,582
1931-32	12,07,476	8,13,596
1932-33	13,57,476	9,88,936
1933-34	13,52,334	9,04,096
1934-35	27,43,947	21,13,058
1935-36	29,46,554	24,98,917

The Grax and Luxmi Salt Workers are rapidly expanding. The Luxmi Salt Works reconstructed their pans in 1931-32 and raised their number from 56 to 130. They have also got 45 acres to the south for reservoirs. They were also granted a further area of 42 acres on the understanding that they will produce 5,00,000 maunds annually within two years from the grant on pain of forfeiture of their lease. The firm are developing this area for condensing purposes and have raised stone-pitched embankments to impound sea-water. The Eduljee Dishaw Works got a further lease of 500 acres of undeveloped area and reconstructed their pans in 1932. The works cover an area of 1908.51 acres. The Government Salt Works covering an area of 88 acres were leased out to Nusserwanjee and Co., and the lease to them of an area of 45.81 acres to the south of the Government Salt Works has also been sanctioned by the Central Board of Revenue. It is thus clear that expansion is going on very rapidly.

Transport facilities are essential for full development of all these works. The present transport for Grax and Gulbai works is a pier known as Stone Bunder. A light Railway Siding runs on to this pier. Country barges come to the pier on high tide and are loaded. Salt from Gulbai Works comes on camels. The old Government and Luxmi Works have an embankment carrying a light railway track and forming a camel path as well which runs to the Jetty. Country boats float at the loading point and are loaded during high tide. Various transport schemes such as the dredging of a channel, enlargement of the pier, construction of a light railway through the whole area were examined by the Salt Survey Committee. The Committee suggested the building of a pier and about 1,500′ length at Stone Bunder with a suitable jetty and recommended the dredging of a shallow stretch of the creek to enable boats to reach the old Government and Luxmi Works at low tides. The schemes are still under consideration.

2. *Natural deposits. Darwari and Saran.*—Sind has immense natural deposits. As long ago as 1847 Lt. Burke, Executive Engineer, P. W. D., Sind, considered the dimensions of the natural salt deposits to be 20 miles by 15 miles with an average thickness of 3 feet. He said, " the quantity at an annual allowance of 20 lbs. per head would supply a population of one hundred millions for one thousand six hundered and sixty-two years."

He thought this salt could easily capture the Bengal market. He said, "Cheshire salt can, I understand, be shipped at Liverpool for 12 sh. a ton. Scinde salt can be shipped at the mouth of the Indus for three or four sh. a ton, all expenses included. Add to this the difference in mileage to be covered, *viz.*, between 3,300 and 12,000, and Sind salt can certainly undersell Liverpool ". The quality of salt is excellent and the cost of excavation is not very high. The only difficulty is that of transport which is at present by camels up to Dilyar Depot at about 0-4-0 a maund. There is a proposal to construct a branch Line from Pithoro to Khadro *via* Khipro which will pass Dilyar at a distance of 3 miles and the lessees propose to connect Darwari deposit with the Line. If this materializes, the salt will have a much better chance of selling at Calcutta.

The Deposits at Darwari and Gaganwari were leased out to Joti Pershad and Co., from 14th January 1932. The Saran deposits and the deposits in the adjoining areas have been leased to Eduljee Dinshaw and Co.

The Tariff Board considered that Karachi sources could supply 87,000 tons to Bengal when well developed. The Salt Survey Committee was of the opinion that the sources could be developed to supply 180,000 tons Both the Board and the Committee held that the cost of production is not very high. Karachi salt compares favourably with other solar salts sold at Calcutta. Karachi supplied over 21 lakhs of maunds (almost equal to the Tariff Board's figure) to Calcutta in 1934-35.

(iii) *Okha Salt Works.*

The Tariff Board and the Salt Survey Committee both were of the opinion that Okha salt is fit for the Bengal market. The former considerded Okha to be capable of supplying 60,000 tons annually.

The developed area at Mithapur is about 1,100 acres. The output of salt and exports to Calcutta have rapidly risen. The following statement shows the production and exports to Calcutta during the last five years :—

Year.	Production in maunds.	Exports to Calcutta.
1930-31	4,35,955	1,65,933
1931-32	9,30,951	3,54,462
1932-33	9,41,784	9,19,296
1933-34	12,82,007	10,38,586
1934-35	17,15,540	15,78,300

The firm have two Extension Schemes. The Mojab village is three miles from Mithapur and a plain of 600 acres there can be used as condensing area. Aramada village is about four miles from Port Okha—a large low-lying swamp covering an area of about 1,000 acres. About 800 acres of condenser area can be obtained by the erection of suitable dams, automatic gates, protective works, etc., to impound brine in this swamp. The management are thinking of pumping this brine to Mithapur where salt will be crystallized and crushed. The project is expected to cost Rs. five lakhs. The Company is gradually proceeding with its extension programme.

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On an estimated output of 60,000 tons, the Company consider the cost of salt to be Rs. 3 per ton. The cost calculated by the Tariff Board and the Salt Survey Committee C. I. F., Calcutta is about Rs. 64 per cent. maunds. The quality of salt is good—asphalt pans can produce a very good salt which can successfully compete in the Bengal market with other Indian or Aden salts. The works produced over 17 lakhs of maunds in 1934-35 ; the output could ultimately be raised to 1,20,000 tons (34 lakhs of maunds), if the Extension Schemes are pushed through.

(iv) *Morvi Salt Works.*

The works are well situated like Okha Salt Works. The present area under development is about 625 acres. A second area situated almost alongside the first on the other side of the Railway Line can be developed to serve as extra reservoir and condenser space by the erection of a bund fitted with automatic sluice gates which will permit of the entry of brine at high tide and its retention at the low tide. The production is likely to be 65 tons per acre, so the present area can give about 40,000 tons (11-12 lakhs of maunds) per annum. If the second is developed, 80,000 tons could be expected. Taking all expenses, freight, etc., into consideration, the cost of salt at Calcutta would be Rs. 59-8-0 per cent. maunds and so it could have some chance. With regard to the quality, the Salt Survey Committee observed, " the quality of salt produced at this source appears to us to be high enough to compete with a reasonable chance of success in the Calcutta market ".

Since 1931, the works have been developing, though slowly. Exports to Calcutta which were 192,520 maunds in 1932-33 rose to 358,150 maunds in 1933-34 and to 492,081 maunds in 1934-35.

Salt Works in other States.—Bhavnagar, Navanagar and Porbander States too have been permitted to export salt to Bengal. Works have much developed in Porbander which exported 3,46,320 maunds to Calcutta in 1933-34 and 6,19,570 maunds in 1934-35.

(v) *Bombay.*

The Indian Taxation Enquiry Committee suggested that the manufacture of salt suitable for Bengal should be encouraged in Bombay and Madras. The Tariff Board did not think that the Bombay salt would be acceptable to Bengal. Bombay salt sources suffer from some serious disadvantages. All around the works the area is composed of thick alluvial mud which becomes a plastic mass during the rains. It is impossible to erect any works of permanent nature. Moreover, the heavy rainfall damages the works and pans, necessitating a great expenditure on repairs. The working season is short. Thus the cost of production rises. Besides, the system of grading and sale by measures encourages the production of a light salt unfit for the Bengal market. The salt is large-grained and dirty, and being moist, it cannot be easily crushed.

Taking into consideration the cost of production, carriage to ship, ground rent, freight to Calcutta, and crushing charges, the price at Calcutta comes to about Rs. 65—70 per cent. maunds. So the salt has not got much chance. Even in War days, when the price of Liverpool salt rose very high, Bombay salt did not command general sales in the Bengal market, where the primary considerations are whiteness, evenness

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of grain and absence of moisture. There has, however, always been a small special market for this salt, in which the considerations mentioned did not prevail, Bombay exported 356,232, 428,529, and 432,023 maunds to Calcutta in 1932-33, 1933-34 and 1934-35 respectively.

(vi) *Madras.*

The position, as regards Madras, is rather better though not quite hopeful. The system of sale by measure has the same effect here as in Bombay. Moreover, most of the salt is manufactured by licensees with whom the primary consideration is to prepare a quality which would command a ready sale. Purity of the article produced is only a secondary consideration. The sodium chloride content is not very high—about 91—93 per cent. and salt is a bit discoloured.

Attempts were made in 1914-17 to send salt to Calcutta ; white salt from the Government factory at Vallur was sent, but the transaction did not prove profitable. Then there were some exports during 1922-23 owing to extra demand, as the imports of foreign scalt decreased due to a coal strike in England and to changes in duty. But the salt did not have a favourable reception and had to be destroyed.

With regard to the protection afforded by the Salt (Additional Import Duty) Act, 1931, the Collector of Salt Revenue, Madras in his Administration Report for 1930-31 observed, " The scheme has very little practical application to the Madras Presidency, as the high freight charges for transport of salt by sea to Calcutta and the absence of private enterprise to undertake the crushing of salt to make it suitable for the Bengal market make any export of salt on an appreciable scale to Calcutta from this Presidency improbable ".

The Central Board of Revenue considered Tuticorin salt capable of sale in Bengal. They said " Tuticorin possesses considerable natural advantages. The climate is dry and the working season consequently extends to 10 months, compared to only four months in the north of the Madras Presidency. The skill of the Tuticorin salt makers is not surpassed in India ". The production at Tuticorin, however, could not be much expanded, as the supply of pit brine which is used as the basic raw material is liable to exhaustion. Exports to Calcutta from Tuticorin in 1932-33, 1933-34 and 1934-35 were 402,128, 297,799 and 417,932 maunds respectively.

(*vii*) *Bengal, Bihar and Orissa.*

A detailed account of the salt industry in Bengal, Bihar and Orissa has already been given. Various steps have been taken by the Local and Central Governments to revive the local salt industry. Investigations into possibilities of manufacture have been made by Mr. Pitt, and recently by salt experts from Burma and Sind. Licences have been issued to various firms and persons to manufacture salt. Government is giving all possible help and facilities to the manufacturers. Salt manufactured in Bengal, is, however, handicapped by many natural circumstances. The chances of the province being self-supporting in salt are remote owing to the production being uneconomic.

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(*g*) TRANSPORT COSTS AND THEIR BEARING ON THE PROBLEM OF MAKING INDIA SELF-SUPPORTING IN THE MATTER OF SALT SUPPLY.

Under (*f*) above passing reference has been made to the obstacle placed in the way of salt from the Northern India sources being marketed in Bengal by railway freights. This subject will be dealt with in a more general way in this section. In their report on the Salt Industry the Tariff Board coupled their suggestions for the development of the Northern India salt sources with suggestions for the reduction of railway freights from those sources to Bengal, *vide* paragraphs 59 to 61 of the Report. As the result of correspondence with the Railway Administrations concerned, the Government of India have been able to secure the following concession rates of freight on crushed salt from Sambhar, Khewra and Pachbadra and on *reshta* salt from Sambhar to Calcutta and stations west of Calcutta :—

Freight rates from Sambhar.

To Calcutta (Howrah)	·1 pie per maund per mile *plus* 2 pies per maund for transhipment, or 8 annas 5 pies per maund.
To stations short of Calcutta ..	Freight at the minimum rate of ·1 pie per maund to the destination *plus* the rate from Howrah to the above destination.

Freight rates from Pachbadra.

To Calcutta (Howrah)	·1 pie per maund per mile *plus* 2 pies for transhipment at Agra East Bank, making the total through rate 10 annas 4 pies per maund (inclusive of 1 anna 10 pies for freight on the Jodhpur Railway Section).
To stations short of Calcutta on the E. I. Railway.	Freight at the minimum rate of ·1 pie per maund to the destination *plus* the rate from Howrah to the above destination.

Freight rates from Khewra.

To Calcutta (Howrah)	11 annas a maund calculated at the minimum rate ·1 pie per maund over the distance of Calcutta from Khewra, *viz.*, 1318 miles).
To Stations short of Calcutta on the E. I. Railway.	8 annas per maund *plus* the rate from Calcutta to each of these stations, provided that the total rate is not less than ·1 pie per maund per mile.

The price of Aden salt of the standard quality in Calcutta at present varies between Rs. 40 and Rs. 50 per hundred maunds ; the following quotations are based on the particular rate prevailing on a recent date, namely, Rs. 47. Adding Rs. 18-8-0 for handling expenses the price of foreign salt F. O. R. Calcutta is 10 annas 6 pies a maund. The price of ordinary Sambhar crushed salt comes to 4 annas 9 pies to which 3 pies should be added for despatch. The F. O. R. price of the salt at Sambhar is therefore 5 annas. Adding freight at the above reduced rate, the delivery price of Sambhar salt at Calcutta would be 13 annas 5 pies a maund. This salt cannot therefore compete with imported salt in Calcutta, and it has been calculated that it will have no chance in any part of the Bengal market so long as the prices of imported salt range at anything like the present rates. The prices of crushed pan salt and reshta salt (a species of wind salt which though not crushed salt is rather similar in appearance

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to crushed salt) F. O. R. Calcutta are lower, because it has been decided not to debit them with any share of the ordinary overheads at Sambhar ; they come to 10 annas 8 pies and 9 annas 8 pies, respectively, and so Reshta salt can find a market in Bengal and B. and O. as far as Calcutta whereas pan salt can be marketed up to the environs of Calcutta though not in Calcutta itself, as the following statement will show :—

F. O. R. price.

Station.	Foreign salt.	Sambhar salt.	Pan salt.	Reshta salt.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Patna	1 0 0	1 0 6	0 13 9	0 12 9
Gaya	1 0 8	1 1 1	0 14 3	0 13 4
Bhagalpur	0 14 8	1 0 4	0 13 7	0 12 7
Luckee Sarai	1 0 5	1 1 1	0 14 4	0 13 4
Hazaribagh Road	1 1 4	1 1 6	0 14 9	0 13 9
Gomoh	0 15 11	1 1 3	0 14 6	0 13 6
Monghyr	0 15 4	1 0 1	0 13 4	0 12 4
Dhanbad	0 14 11	1 1 1	0 14 4	0 13 4
Asansol	0 14 9	1 0 8	0 13 11	0 12 11
Raniganj	0 14 9	1 0 8	0 13 11	0 12 11
Burdwan	0 13 3	0 15 7	0 12 10	0 11 10
Howrah	0 10 6	0 13 5	0 10 8	0 9 8

The issue price of Pachbadra salt has been fixed by Government at 3 annas a maund. The price of crushed Pachbadra salt F. O. R. Howrah on the basis of the above reduced freight is 14 annas 4 pies compared with the price of 10 annas 6 pies for imported salt. This salt cannot therefore compete with imported salt in Calcutta or in the vicinity of that city.

In regard to Khewra, with a view to stimulate the sales of this salt in Bengal the Government of India in 1933 sanctioned a reduced selling price of three annas per maund on crushed Khewra salt inclusive of despatch charges. This rate was to apply to despatches to stations on the E. I. Railway east of (1) Khalispur on the Benares Cantonment-Fyzabad Loop Line, (2) Chaukhandi on the Benares Cantonment-Chilbila Main Line and (3) Pahara on the Moghal Sarai-Allahabad Main Line, where it was calculated that the above reduced selling price and the concessional freight rates offered by the Railways would operate favourably as compared with the ordinary rates of freight and price of the salt. This calculation was made in 1932 when the statutory buying-in price of foreign

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salt in Calcutta was Rs. 66 per hundred maunds or about 11 annas per maund. The price of imported salt F. O. R. Howrah was 14 annas during those days and so Khewra salt was expected to displace the former in the Bengal zone up to Calcutta itself but this is now impracticable in view of the large fall in the price of imported salt. The following figures will illustrate the position :—

Destination.	Position in 1932-33.		Present position.	
	Price of imported salt F. O. R.	Price of Khewra salt F. O. R.	Price of imported salt F. O. R.	Price of Khewra salt F. O. R.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Calcutta	0 14 0	0 14 0	0 10 6	0 14 0
Khalispur	1 7 1	1 4 1	1 3 7	1 4 1
Chaukhandi	1 7 0	1 4 0	1 3 6	1 4 0
Pahara	1 7 1	1 4 1	1 3 7	1 4 1

It will be clear from the foregoing that under present conditions, if salt from Northern India can be marketed in Bengal in competition with imported salt it is only Reshta salt and crushed pan salt from Sambhar. Substantial quantities of these qualities have already been marketed.

Salt from Tuticorin in the Madras Presidency, the sea salt works in Bombay and the salt works in Maurypur (Karachi) is also being marketed in Bengal this being possible owing to the cheap steamer freights. This salt would be ruled out of that market if it had to be transported by the inland rail route as rail freight charges would be prohibitive.

Recently the difficulties which Naupada (Orissa) salt has to face in competing with Aden salt in Bengal were brought to the notice of Government and Government assistance in overcoming them was sought. The matter was examined by Government but it was found that nothing could be done in the matter. The cheapness of steamer freights on Aden and other sea-borne salt compared with railway freights stands more than anything else in the way of rail-borne salt finding a market in Calcutta. It is for this reason, that, despite the fact that Waltair is much nearer Bengal than Aden or Karachi, it is still at a disadvantage so long as favourable sea freights from Waltair are not available. The favourable rate which has been recently quoted by the Bengal Nagpur Railway for Naupada salt works out at Rs. 7-6-0 per ton whereas the current freight rate for salt from Aden is about Rs. 5-8-0 per ton. It is thus obvious that, apart from the question of popularity in the market, Naupada salt would continue to be at a disadvantage in competition in Calcutta not only with Aden salt but also with Karachi and Tuticorin salt, all of which have the advantage of cheap steamer freights. It should, however, have some advantage in that limited portion of the market for imported salt which lies between Orissa and Calcutta.

The Darwari Salt Deposit in the Thar Parkar District of Sind, which has been leased to Joti Pershad & Co., is capable of producing large quantities of salt. The Tariff Board considered this salt as being of exceptional purity containing as much as 99 per cent. sodium chloride. It is of a very white colour and when crushed is equal or superior to much of the salt at present imported in Calcutta. But this source of supply is at present not connected by rail communication, and consequently Darwari salt is handicapped by transport difficulties and has to be sold within the vicinity of the place of production. It may be stated here that the B. B. and C. I. and E. I. Railway Administrations have, at the instance of Government, agreed to allow crushed salt from Darwari to the Bengal Market the same concessional rates of freight that they have sanctioned for Pachbadra crushed salt.

The general conclusion is that though India as a whole has the capacity to produce all its requirements of salt, except for very limited special demands, or has this capacity, at least, if Aden is still treated as part of India,—the dominating factor is the cost of transport. This could only be surmounted by the maintenance of some sort of protection at a high level. The difficulty is that the burden of such a measure must fall upon North-Eastern India while the advantages would go to quite different parts of India, and the greatest advantage of all to a territory (Aden) which, geographically, is not and, politically, will shortly cease to be part of India.

APPENDIX.

Authorities consulted.

Administration Reports.

Annual Administration Reports of the Inland Customs Department from 1869-70 to 1881-82.

Annual Administration Reports of the Madras Salt Department.

Annual Administration Reports of the Bombay Salt Department.

Annual Administration Reports of the Northern India Salt Revenue Department from 1882-83 to date.

Annual Administration Reports of the Sind Salt Department.

Annual Administration Reports of the Burma Salt Department.

Annual Administration Reports of the Salt Department in Bengal.

Annual Administration Reports of the Salt Department in Bihar and Orissa.

Other Books and Reports, etc.

A note on the manufacture of salt in Madras and Bombay. Mr. J. C. Fergusson.

A short Review of Mr. Plowden's Report by Dalzel.

A tour in the Salt Range by Dr. Warth.

Bombay Salt Department Manuals.

Dictionary of Economic Products of India by Watt.

Development of the Sambhar Lake Salt Source by Mr. Bunting.

Evaporation—Bulletin No. 7 by Manistee Iron Works Co., Michigan, U. S. A.

General Report on the Salt—Producing capabilities of the State of Jodhpur or Marwar including Godawar and Mallani.

Golden Rules of manufacture of salt in Rajputana by Mr. English.

Hand Book of Commercial information for India by Cotton.

Hand Book of Common Salt by Mr. J. L. Ratton.

Indian Mines Manual by Mr. R. R. Simpson.

Madras Salt Department Manual. 3 volumes.

Memorandum on the Salt Supply of Northern India. (Government publication.)

Memorandum on the results of a cursory examination of the Salt Range in the Punjab and of parts of Bunnoo and Kohat with a special view to the Coal and other Mineral resources of those districts by Thomas Oldham, L.L.D., Superintendent of the Geological Survey of India (1864).

Memoir Geological Survey of India, Volume XIV, on Salt Range by Mr. Wynne.

Monograph on Common Salt, published by Federation of Indian Chamber of Commerce and Industry.

Northern India Salt Department—Manuals all parts.

Northern India Salt Revenue Department, old Manual Part 11 (Treaties).

Note on the Northern India Salt Revenue Department (Government Publication).

Report of the Industrial Commission, 1916.

Report of the Indian Taxation Enquiry Committee. 2 Volumes.

Report on the Salt Industry in India by the Indian Tariff Board.

Report of the Salt Survey Committee, 1931.

Reports by the Central Board of Revenue on the working of the Salt (Additional Import Duty) Act. 3 reports.

Report on the system of weighing salt in Bengal, Madras, Bombay, Sind and Northern India by Mr. S. J. Kilby.

Report on the manufacture and sale of and tax upon Salt in British India by Mr. George Plowden, 1856.

Reports of the Salt Industry Committee of the Assembly. 4 reports.

Report of the Salt Committee, 1904.

Report of the Madras Salt Commission, 1876.

Report on Punjab Salt Mines by Dr. H. Warth.

Report of the Royal Commission on Labour.

Report on the possibility of the Manufacture of Salt in Bengal, Bihar and Orissa by Mr. C. H. Pitt.

Report on Burma Salt and Allied Industry by Messrs. Wingate and Thurley.

Report on the Inspection of the Mayo Salt Mine, Salt Range, Khewra and of the other Salt Mines in the Salt Range by Mr. James Grundy, 1898.

Reports on the administration of the Punjab and its dependencies for the year 1851-52 and 1952-53.

Report by the Financial Commissioner, Punjab, on the administration of Customs and Salt Revenue Department of the Punjab from 1861-62 to 1865-66.

Reports by the Chief Inspector of Mines in India from 1920 to 1934.

Report on the Salt Deposits of Canada and the Salt Industry by L. Heber Cole, B.Sc.

Representations to Government of India by the Indian Salt Association. 7 pamphlets.

Rough Notes on Colonel Bruce's Pamphlet "The Salt Sources of India".

Salt and Salt Industry in England by A. F. Calvert.

Salt Mining in the Punjab by Mr. C. H. Pitt.

Saltpetre Manufacture in India by Mr. J. C. Fergusson.

Sketch of the Geology of the Punjab by Medilicott.

Statistics relating to Salt in India (Government publication).

Statement of Retail Prices of Salt (Government publication).

System of the Administration of the India Salt Revenue (Government publication).

The Commercial Products of India by Sir George Watt.

The History of Salt by E. Marlett Boddy.

The Industrial Punjab by Mr. Latifi.

The Journal of Indian Art and Industry, Volume IX, 1901.

The Salt Sources of India and the Customs Preventive Establishment of the North-West Provinces, Central Provinces and the Punjab by Lt.-Colonel H. Bruce.

The Systems and Practice of Salt Administration in India.

The Salt Industry of Rajputana by Mr. Ashton.

Ure's Dictionary of Arts—Salt.

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